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ABSTRACT

A survey of all hospitals accredited by the American Hospital Association was made to ascertain how the physically handicapped performed at jobs in medical laboratories. Detailed questionnaires were sent to laboratory directors, and the results were processed by computer to determine whether correlations exist between the number of disabled persons employed and the type of hospital, size of laboratory, and geographic location, and whether the type of disability has a significant relationship to type and time of training, job assignment, level of responsibility, and quality of work. A field study and demonstration program were also conducted in three states using interviews with the disabled and their supervisors. Most disabilities did not prevent successful performance of laboratory jobs, but there was a widespread lack of communication between counselors who advised the disabled and those who hired and trained workers. Of the 693 disabled included in the hospital survey, 91 percent were performing satisfactorily on the job. Attendance records were equal to or better than those of other employees; moreover, it was found that disabled persons remain on the job longer than the nondisabled. (BC)

CAREERS FOR THE HANDICAPPED IN MEDICAL LABORATORIES

A Study of Disabled Hospital Laboratory Employees: How More Disabled Men and Women Can be Attracted to the Medical Laboratory Field, Screened Appropriately and Given the Type of Laboratory Training Suited to Their Particular Limitations

FINAL REPORT

Grant Number RD-1953-G

Submitted by

NATIONAL COMMITTEE FOR CAREERS IN MEDICAL TECHNOLOGY
9650 Rockville Pike, Bethesda, Maryland 20014

July 30, 1969

SIGNIFICANT FINDINGS. . .

- Most medical disabilities are not handicaps to the person seeking a career in the medical laboratory field.
- Individuals with all types of disability have been successfully employed by hospitals throughout the country, in every laboratory department and at all staff levels with salaries comparable to those paid to non-disabled employees.
- With the exception of quadraplegics and the totally blind, even the severely handicapped have made a place for themselves in this field, usually working exclusively in one laboratory department in specialized jobs that are compatible with their limitations.
- All types of disabled persons have been successfully trained in the regular programs in AMA-Approved Schools of Medical Technology, Cytotechnology and Certified Laboratory Assistants with some training modifications for the totally deaf, occasional adjustments for some of thoses with emotional problems, seizure disorders and severe visual handicaps, and minor adaptations for some with severe ambulatory impairments.
- Usually it is not disability but personal attitude, emotional maturity and intellectual ability that have determined success or failure for the disabled person, although people with mental problems and seizure disorders need more careful and individual screening.
- Most of the people employed in hospital laboratories or enrolled in approved laboratory training schools today have had no contact with DVR agencies.
- Wider utilization of the disabled by medical laboratories depends on more widespread understanding of laboratory standards and training requirements by DVR offices and better communication and closer working relations between rehabilitation and laboratory personnel in local communities.

CAREERS FOR THE HANDICAPPED IN MEDICAL LABORATORIES

FINAL REPORT

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Submitted by

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July 30, 1969

P R E F A C E

The clinical laboratory offers a wide range of professional and semi-professional jobs for the person with a scientific bent who is interested in putting knowledge about disease to use in saving human lives. The early presence of cancer, for example, can only be detected by examinations performed in the cytology laboratory. Results from the laboratory may be vital to the surgical team in the operating room, and emergency blood transfusions depend on the precise blood matching tests done in the laboratory. These and numerous other procedures are carried out in today's laboratory with a vast array of precise and intricate equipment -- from microscopes to automatic analyzers and electronic counters.

Finding people with the attributes and training needed to perform these laboratory services is becoming a more serious problem every year. It gives me deep satisfaction, therefore, to submit the results of this 4-year study which shows that there is a real place for the handicapped in this vitally important work.

Thomas M. Peery, M.D.

July 30, 1969

ACKNOWLEDGMENTS

This study would not have been possible without the sympathetic interest and help of a great many pathologists and medical technologists in every part of the country. We are very much indebted to them.

We would also like to acknowledge the helpful cooperation of rehabilitation officials in New Jersey, New York and Pennsylvania and particularly that of New York DVR's Howard Berger, who organized meetings of laboratory directors and teaching supervisors with rehabilitation counselors in every district in the state. These meetings set the pattern for implementing the findings of our study.

Finally, we wish to thank a group of very able "handicapped" laboratory workers who allowed us to tell their stories to the public.

C O N T E N T S

VII. APPENDICES

I. INTRODUCTION

The practice of medicine today would be impossible without the clinical laboratory where the multitude of chemical and biological tests are performed on which the physician depends for diagnosing and treating disease. A growing population plus government health programs such as Medicare have greatly increased the demand for laboratory services, and there is an increasingly serious shortage of professional and technical medical laboratory workers in many parts of the country.*

Training standards for work in this field have been set by the medical profession, and there are schools in every part of the country offering training at several different levels which have been approved by the Council on Medical Education of theAmerican Medical Association in collaboration with the Board of Schools of the American Society of Clinical Pathologists and the American Society of Medical Technologists.

The Medical Technologist who works directly under the clinical pathologist, holds the key position in the laboratory, for she is responsible for quality performance of the laboratory tests on which a patient's life may depend. Three years of college plus one year's clinical training in an approved school are needed for this position. The Cytotechnologist, who performs microscopic examination of body cell samplings for early signs of cancer, needs two years of college plus one year of training in an approved school. For the high school graduate there are approved schools for Certified Laboratory Assistants,who do many of the simpler laboratory tests under the supervision of medical technologists, and one-year training programs under the direction of a pathologist for Histologic Technicians, who cut slices of body tissue paper thin, mount them on slides and stain them with special dies for microscopic examination by the pathologist.

Graduates of these training programs are eligible to take national certifying examinations on successful completion of which they are registered by the Board of Registry of the American Society of Clinical Pathologists as medical technologists - MT(ASCP)'s, cytotechnologists - CT(ASCP)'s, certified laboratory assistants - CLA's or histologic technicians - HT(ASCP)'s.

Fifteen years ago three professional societies - the American Society of Clinical Pathologists, the College of American Pathologists and the American Society of Medical Technologists - sponsored the establishment of the National Committee for Careers in Medical Technology to help recruit workers for what was even then a rapidly growing field.

* Estimates by the Labor Department and the Public Health Service in 1967 projected an increase in professional and semi-professional laboratory workers from approximately 90-100,000 to a range of 150,000-200,000 by 1975, and a recent study by the Manpower Administration of the U.S. Department of Labor predicted that "the greatest expansion in number of (health service) jobs in the decade ahead will probably involve the X-ray and clinical laboratory departments."

The investigation reported in these pages was undertaken by NCCMT in the belief that there is a reservoir of potentially good laboratory workers among disabled men and women who could be trained to help fill these personnel needs. To further this basic aim of BRINGING MORE DISABLED MEN AND WOMEN INTO LABORATORY WORK several specific objectives were formulated for the study:

(1) To find out how hospital laboratories are now utilizing the disabled and how people with different types of medical disability have been able to meet the physical and emotional demands of various laboratory jobs;

(2) To find out what kind of laboratory training is best suited to people with different disabilities;

(3) To explore the barriers that stand between the disabled person and a career in this field and find ways of breaking these barriers down.

There appear to be no studies on the capabilities of the handicapped that are focused on this particular para-medical career, and while hospital laboratories throughout the country have had a wealth of experience training and employing the disabled, the information is scattered and has never been correlated and analyzed.

A preliminary study by NCCMT under a Planning Grant from the Vocational Rehabilitation Administration showed that a number of disabled individuals have worked successfully in the laboratory, but the sample of laboratories studied was too small and the data obtained too limited to permit general conclusions regarding the suitability of different laboratory jobs for people with various types of disability. The investigation reported here has actually attempted to break new ground by correlating the physical and emotional requirements of laboratory jobs with the functional limitations of various types of disability.

Basic research on the project was carried out at NCCMT's headquarters in Bethesda, Maryland, and the training of disabled students during the demonstration program was carried out entirely in AMA-approved schools with which NCCMT has had close and continued contact for 15 years.

II. HOW THE PROJECT WAS CONDUCTED

Since the problems to be tackled involved several disciplines, an Advisory Committee was appointed to plan and guide the project with experts from the fields of laboratory medicine, vocational rehabilitation, physical medicine, special education, psychology and electronic data processing. Project Chairman was Thomas M. Peery, M.D., Chief of Pathology at George Washington University Hospital, Washington, D.C. and President of the American Society of Clinical Pathologists. Dr. Peery is also Director of a Cytotechnology Training Program for the Deaf at George Washington University in cooperation with Gallaudet College.

Active throught the project both as members of the Advisory Committee and as individual consultants were: Nellie May Bering, MT(ASCP), Training Coordinator at Sibley Hospital and Doctors Hospital, Washington, D.C.; Marian Martin, Director of Vocational Rehabilitation, New York State Department of Education; Edward W. Lowman, M.D., Clinical Director, Institute of Rehabilitation Medicine, New York University Medical Center; and Martin S. Ulan, Administrator, Hackensack Hospital and former President of the New Jersey Hospital Association.

The following also helped during the planning and research phase of the project: Walter S. Neff, Ph.D., Professor of Psychology, New York University Graduate School; Frances P. Connor, Ph.D., Chairman, Department of Special Education, Columbia University Teachers College; Maxine Kiefer, Ph.D., Technical Consultant, Leasco Systems & Research Corp., Washington, D.C.; and Ruth O'Neil, Supervisory Counselor, Washington, D.C. Department of Vocational Rehabilitation.

Staff members included NCCMT's Executive Secretary, Dallas Johnson, who was project Coordinator and Betts Kenworthy, Research Director. The Field Investigator was Catherine Milos, MT(ASCP), who had been a vocational rehabilitation counselor in New York City for five years following many years experience as a Chief Technologist and Teaching Supervisor in a New Jersey AMA-Approved School of Medical Technology.

The methods used to reach our objectives were the standard three: Research, Demonstration and Implementation.

Research Studies

Two types of research inquiry were used to determine what kind of experience hospital laboratories have had with disabled employees. (1) A survey was made of all the hospitals in the country that are accredited by the American Hospital Association. Detailed questionnaires regarding disabled employees were addressed to the hospital laboratory director. Data from the returns was processed by computer to determine whether there were correlations between the number of disabled persons employed and the type of hospital, size of laboratory or geographic location and to find out whether type of disability had any significant relation to type and time of training, job assignment, level of responsibility or satisfactoriness of work. A companion post-card survey was made of all hospital administrators

to get information about general policy and attitudes toward hiring the disabled, and the results tabulated. At the same time a sample survey was made of vocational rehabilitation counselors in the District of Columbis to get some idea of how much information counselors have about medical laboratory careers and how many VR clients have been given training for this field.

(2) Different techniques were used to take a closer look at disabled hospital employees. A representative group was chosen from among the employees reported in the National Hospital Survey returns from three states -- New Jersey, New York and Pennsylvania. The sample was selected on the basis of the national distribution of different types of disability, and it included disabled employees in all types and sizes of hospitals.

Using an interview schedule developed by the Advisory Committee and staff, the Field Investigator, with the assistance of two Occupational Therapists, interviewed these disabled laboratory employees, as well as their immediate supervisors and laboratory directors to get detailed information on how they had succeeded in meeting the physical and emotional demands of their particular jobs.

The Demonstration Program

In cooperation with the state DVR agencies, the program was initiated in three states in Region II (New Jersey, New York and Pennsylvania), where over 100 approved schools had agreed to give a year's training to qualified disabled students referred by local VR counselors. Later the program was enlarged to include schools in other parts of the country so that a wider range of disabled students in all types of training could be observed.

Information on the students was obtained primarily by the use of a three-part reporting form: Part I to be filled out by the schools on acceptance of a disabled student; Part II when the student had completed 12 weeks of training; and Part III on completion (or termination) of the year's course. In many cases where the type of disability or training merited special attention these reports were supplemented by field interviews with school directors, teaching supervisors and the students themselves.

Implementation

From the beginning of the project its findings were put to practical use. The original hospital survey was sent to <u>all</u> hospitals in the country accredited by the American Hospital Association not only to get widely-based information on present utilization of disabled workers, but also to involve hospital administrators and laboratory directors and alert them to future findings of the project. A summary of the research findings was sent to every hospital and laboratory official who responded to the survey, as well as to all AMA-Approved Schools of Medical Technology, Cytotechnology and Certified Laboratory Assistants in the country. Later findings from the demonstration program were published in the professional journals of hospital, pathology and medical technology organizations.

VR personnel were apprised of the possibilities for their clients in this field by articles in rehabilitation journals, by printed materials and exhibits taken to national and regional meetings of the National Rehabilitation Association, and by memoranda to VR counselors. In preparation for the demonstration program in Region II a series of meetings with VR staff and pathologists and medical technologists from local hospitals were held throughout the three states. The patterns set at these meetings were utilized later by state societies of medical technologists and state pathology societies when they inaugurated local efforts to bring the two groups together in other parts of the country.

During the final year, a guidance tool for counselors was developed. A brochure listing the physical and emotional demands of different jobs in the laboratory and reflecting project findings on the capabilities of the disabled in this field was sent to all VR counselors in the country by mailings to state and district DVR offices.

III. THE RESULTS

The results of this investigation have been both encouraging and challenging, and in some respects very surprising. Essentially what they boil down to is this: MOST DISABILITIES AS SUCH DO NOT PREVENT SUCCESSFUL PERFORMANCE OF MEDICAL LABORATORY JOBS, BUT A WIDESPREAD LACK OF COMMUNICATION BETWEEN THOSE WHO COUNSEL DISABLED MEN AND WOMEN AND THOSE WHO HIRE AND TRAIN WORKERS FOR THE MEDICAL LABORATORY STANDS IN THE WAY OF WIDER UTILIZATION OF THE DISABLED TO FILL LABORATORY PERSONNEL NEEDS.

A. Investigation of Disabled Persons Now Employed in Hospital Laboratories

(The detailed results of these two research studies constitute Part Two of this report, starting on page 22).

A national survey of hospital laboratories followed by intensive study of a selected group of disabled hospital laboratory employees showed that individuals with every type of medical disability are currently employed in hospital laboratories. Replies from 1,984 hospitals in every part of the country reported a total of 693 disabled employees in all the following disability categories: ambulatory, menipulative, recovered mental, auditory, cardio-pulmonary, convulsive seizures and visual. Seventy-two percent of the employees had been trained after they became disabled.

Close study of a representative sample (54 hospital laboratory workers in Region 11) showed that not only were the disabilities of every type but that the degree of disability was often severe. Pathologists classified 18 of the 54 as severely disabled. This group included a Paraplegic, a War Casualty (100% VA disability), two Spastics, two Deaf Mutes, two with mental illness, an Epileptic, one with Cerebral Palsy and one other with Convulsive Seizures, two manipulative (one a left arm amputee), one Asthmatic, one with Rheumatoid Arthritis and three with ambulatory problems (one with Polio affecting both legs, one with congenital dislocated hips and one with congenital Spina Bifida.)

Individuals with each type of disability were employed in every section of the laboratory, and they were working at all staff levels. Of the 693 reported in the hospital survey, 20% were supervisors, 50% held staff positions and 30% were laboratory assistants. The more detailed information obtained in the second study of 54 disabled employees showed that severity of handicap and, to a certain extent, type of disability had an important bearing on the way disabled employees were utilized in the laboratory. They were not restricted to a particular type of laboratory work but scattered through all laboratory departments. However, more jobs were specialized for them than for the non-disabled, and although there was very little job modification, in most cases care had been taken to see that the laboratory position was compatible with the disability.

Most of the severely disabled were working exclusively in one laboratory department and had only received training in the area they were working in. None worked alone with the exception of those in cytology and histology where most tasks can be performed sitting down. More of the severely disabled were also found in bacteriology, cytology, histology and serology which do not require so much moving around as blood banking, chemistry, and hematology and teaching and general assignment.

Most of the disabled were performing well on the job. Of the 693 disabled reported in the hospital survey, 91% were rated as satisfactory workers by their employers. Among the 54 interviewed for the second study, laboratory directors and supervisors rated only six as unsatisfactory. In these cases the disability itself was usually not the main cause of dissatisfaction but rather the employee's emotional attitude. The supervisor of one commented as follows: "She would not accept her limitations... She thought she could do more than she could and was a danger to herself and others."

Nearly every employer attested to the fact that the disabled worker tends to stay longer on the job (of the 54, 21 had been employed in the same laboratory more than six years, and eight of these had been in the same job for more than 15 years) and that attendance records are equal to (and in many cases superior to) those of their non-disabled co-workers. Salaries corresponded to these paid to non-disabled employees doing similar work in the same laboratory.*

Many of the employees interviewed reported that they had had real difficulty breaking into the laboratory field, but said that once they had been trained and had a recommendation from a pathologist getting employment was no problem. All but 10 had had some formal education beyond high school: 13 had taken some college work, 25 had bachelor's degrees, five had master's degrees, and there was one Ph.D. in chemistry. Among this group were 15 who had also taken medical technology training in AMA-approved hospital schools and one who had been trained in cytotechnology at an approved school.

Most of the pathologists interviewed mentioned the need for more college graduates, and several suggested that the disabled needed above minimum training as they could compete more equally with the non-disabled. A disabled employee, who supervised a bacteriology department from his wheelchair, voiced the same thought: "The severely handicapped person needs an extra weapon, and that weapon is a better education than someone else has."

Both studies showed that most of the disabled now employed in hospital laboratories have had no connection with rehabilitation agencies. Of the 693 employees reported in the hospital survey only 35 had been referred to the job by VR. (Whether there was any VR involvement in the training of some of the remaining 658 employees is not known since no specific question was asked on this point.) In the Interview Study it was found that DVR had been involved in the training of only six of the 54: four college trained supervisors (three of them registered medical technologists) and two assistants (one trained in a commercial school and one trained on the job.)

* Salaries between $5,000 and $8,000 were paid to 42 employees; 6 earned under $5,000 and 6 earned over $8,000. It should be noted that these figures were obtained early in 1966, when salaries of laboratory workers were appreciably lower than they are today.

B. Training the Disabled Student

(1) Scope of the Demonstration Project

In many ways the demonstration program was the crux of the whole project. For in order to make a realistic assessment of laboratory career opportunities for the disabled it was necessary to find whether disabled men and women could successfully complete the laboratory training that opens up these careers. By observing a wide range of disabled persons while they were being trained it was possible to tell whether people with all types of disability, particularly those with severe handicaps, were able to complete the overall training programs for medical technologists and laboratory assistants, or whether some could succeed only in specialized and less physically-demanding training such as for cytotechnologists and histologic technicians.

Initially the program was limited to a three-state area where disabled students referred by VR counselors were given a year's laboratory training in approved schools that had agreed to participate in the project. The demonstration was later enlarged to include schools in other parts of the country so as to observe a wider range of disabled persons at all levels of training and to get judgments on the capabilities of the disabled from a larger group of pathologists and medical technologist-teaching supervisors. Since all disabled students (both VR clients and non-VR clients) were included, it was also possible to appraise the extent to which rehabilitation and laboratory personnel are cooperating with each other.

The training of 124 disabled students* in 87 institutions** in 39 states was reviewed. (An additional 30 students were reported by the schools, but they were not included since the information on them was not complete.) The group included 35 men and 89 women, ranging in age from 17 to 51. The students were divided among the different types of training as follows:

medical technology	- 38 students
cytotechnology	- 30 students
laboratory assistant	- 41 students
histologic technique	- 12 students

(The remaining three students were in special training programs: ASCP-approved chemistry, on-the-job laboratory aid and technician training.)

The students represented the whole gamut of medical disabilities, and it is of some significance that the proportion of students in different disability categories turned out to be roughly parallel to that found among disabled employees in the national hospital survey. The percentages are shown in Tables I and II below.

I. 124 disabled students	II. 693 disabled employees
38% - ambulatory	41% - ambulatory
14% - auditory	8% - auditory
10% - manipulative	15% - manipulative
10% - emotional	11% - emotional
8% - cardio-pulmonary	7% - cardio-pulmonary
8% - convulsive seizures	5% - convulsive seizures
4% - visual	4% - visual
8% - other	9% - other

* A list of the students is contained in Appendix A.

** Appendix B contains a list of the AMA-approved schools that trained the disabled students.

(2) Major Findings

Most of the disabled students of all types finished the year's training successfully and were subsequently employed in medical laboratories. Students with ambulatory and auditory disabilities, who comprised more than half of the group studied, were almost uniformly successful, and there were only a few real failures inthe other disability categories even among the most severly disabled.

A majority of the students with the most serious impairments were trained in cytotechnology or histologic technique, but the total evidence did not suggest that such students were necessarily suited only to those specialized types of training. Six of the nine students who were wheelchair paraplegics were graduates of cytotechnology schools, and of the ten totally deaf students, six were trained in cytotechnology, one in histologic technique, and one in chemistry. However, there were a few others with equally severe handicaps who were able to meet the more rigorous demands of over-all laboratory training. Among the graduates of medical technology schools, all of whom were subsequently employed, were three wheelchair paraplegics, two totally deaf students, a student with only one usable hand and arm, two with mental illness that necessitated hospitalization, one student with post-traumatic Grand Mal seizures, and two with loss of bilateral vision.

Training was modified for only 10% of the students. For some of the totally deaf special methods were needed to solve communication problems and most such students required special attention from their instructors. Slight modifications were made for a few of those with seizure disorders and visual handicaps, and adjustments such as special teaching sessions, excused absences and special counseling were occasionally needed for some of the emotionally ill. Aside from this, there were only minor adaptations -- such as exemption from picking up blood samples on hospital floors or the construction of lower laboratory work benches -- generally for those with serious ambulatory limitations. With only one or two exceptions, normal training routines were not disrupted by the presence of disabled students, although the special attention given by instructors was an important factor in the success of several students.

Failure to complete training was due to personal attitude, emotional adjustment and intellectual capacity as much as to disability. Of the 124 students, 20 withdrew before completing training. Nine of these students dropped out or were terminated by the school for reasons directly related to their disabilities: Two students (one with Cerebral Palsy and the other with spastic paralysis of the left hand and arm) could not control tremor or shaking of their hands; two Epileptics because of the reaction to medication used to control seizures; three because of illness -- one with a heart condition complicated by a past history of Uremia and mild anxiety, one with Hashimoto's disease with anemia and ulcer; and one with tuberculosis; one student with a corneal cataract was unable to perform satisfactorily, and two with emotional problems did not finish. In addition, one student confined to a wheelchair because of Polio died of acute pneumonia during training.

Of the remaining nine, three dropped out for personal reasons, three were terminated because their academic progress was unsatisfactory, and three because they were immature or undisciplined.

Age appeared to have no bearing on the success or failure of the students. Forty-two of the students were over 26, eleven of them between 40 and 51. Seven of these students did not complete training (roughly 17%). Among the 82 students under the age of 25 there were 13 failures (slightly under 16%).

The attrition rate for disabled students compared favorably with the national attrition rate of 5% for medical technology and cytotechnology schools (complete figures are not available for CLA schools). Among the disabled students in the study, there was only one failure among the 38 medical technology students, and two among the 30 cytotechnology students.

The importance of personal attitudes and emotional characteristics in the success or failure of disabled students was stressed by many teaching supervisors. The following comments were made on two (of the 20) who failed to complete training:

Deaf CLA Student (one ear corrected with hearing aid) - the only failure among 18 deaf students:

> "Her practical and academic work were both satisfactory, and she was able to do all the tasks required of a CLA. Her problem was that she didn't believe she could and expected other people to complete assignments for her. She wanted someone to make decisions for her and 'mother' her."

CLA Student with Epilepsy (medicated):

> "This student was terminated at the end of five months with the concurrence of the social worker and VR counselor for excessive absence, irresponsible behavior and lack of academic progress - not because of disability. She frequently had visitors until 4:00 AM with subsequent seizures probably due to exhaustion."

Below are comments on six (of the 104) students who were successful:

Cytotechnology graduate, totally confined to wheelchair because of automobile accident:

> "He was a good student, emotionally mature and stable even though his wife had left him after his accident. He received no privileges during training and could perform as well as any of the other students."

Medical Technology graduate with loss of bilateral vision, difficulty in focusing:

> "He had some problems using the microscope, in labelling and in situations where columns of figures were involved. However, he was extremely industrious and aware of his own limitations. One of our more outstanding students ... He scored in the 89th percentile nationally on the certifying examination. He is now employed in this area and has proved to be an excellent technologist."

Medical Technology graduate partially confined to wheelchair because of Polio:

> "She does not appear to regard her disability as a handicap when it comes to doing her work. She went out onto the hospital floor in her wheelchair each morning to help pick up the morning blood samples. Besides going to classes full time during the day, she stayed and worked evenings in Hematology to get the extra experience. She is now employed here, working the 3 to 11 PM shift. She has been a good employee and a reliable technologist."

Histologic Technician Trainee with Aplastic Anemia (Requires one blood transfusion per week -- prognosis poor, life expectancy limited):

> "X is a very good looking young man who appears to have accepted his condition, but is confident there will be a cure someday and is determined to lead a normal life. Both the school director and teaching supervisor are satisfied with his progress but admit the necessity of accepting occasional absences because of his condition. The understanding and cooperation of other staff members is most important for such an employee could not be retained if they resented the extra work. In the present shortage of trained laboratory personnel, supervisor thinks that such special needs can be accommodated. The work he does is excellent and necessary. Both the director and the student himself admit he could and should be doing more. Student considers this only as a basic skill and hopes to go on to medical technology training if possible."

CLA graduate with crushed feet from automobile accident (cannot stand for long):

> "M. pushed a little harder than the other students, and often she was a stabilizing factor in a difficult classroom situation. We attempted to modify her walking distance (picking up blood samples, etc.), but her determination to prove her capability usually caused our concern to dissipate quickly ... I had my doubts at first, but now I'm challenged. I would like very much to train a severely handicapped person in a wheelchair. Since our hospital is all on one floor I feel we could adapt the trainee quite easily."

Cytotechnology graduate, post-traumatic spastic, partial paraplegia (25% use of right arm and leg, 90% on left side; requires drop foot braces and cane):

> "A very intelligent, determined honest student. He showed courageous determination to overcome handicap."

The following pathologist's report on a medical technology student indicates some of the limits to schools' adaptability to the disabled:

> "This girl has become a bigger problem than I had realized she would be. She has diabetes and rheumatoid arthritis, and in addition, a tremendous fund of courage. I felt that such courage deserved consideration and I accepted her for our training course despite these handicaps. I realized that her life expectancy was short but thought that she might have a few years of productive

activity after completion of her training. She has tried very hard to do a good job and actually has done well on examinations ... But my evaluation was wrong, for she is now in low-grade uremia and has developed additional health problems. As the year progressed, her eye-sight became poorer, and this was a most difficult thing to deal with in her training ... We carried her through to completion and it was a most trying period for we did not know just where to place her in our laboratory and how best to try to train her. The technologists deserve the greatest praise in this for they managed to carry her on out of sympathy, but I would never ask this of them again. I think that some degree of disability can be coped with but not one of this degree."

The employment outlook for students with mental and emotional problems was of particular concern to many school directors and teaching supervisors, although all but two of the 12 students in this category completed training successfully.

A special report from the director of a medical technology program who had trained three students with mental illness epitomized the viewpoints of many and pointed to the need for careful and individual screening of persons with mental and emotional problems.

"Whether such students can succeed in a medical technology program and subsequently on the job depends primarily on the success of the psychiatrist in the medical management of the person and secondarily on the understanding and acceptance of the student by his peers and employer. Some difficulties result from a lack of understanding and communication with the physician. Failures would be decreased and fears lessened if the teacher or employer had greater insight into the problem.

Each case needs to be judged individually. One of my main concerns is whether or not the graduate will be able to perform adequately on the job. It is always possible to adjust school programs in order to give special teaching sessions and to allow the student special time off. However, the job situation is different. In most laboratories it is difficult to make special arrangements for employees who cannot keep up with the normal activities expected of the professional medical technologist. Not only is this a scheduling problem but also a problem of total staff morale."

A Cytotechnology School Director reported as follows on one of his graduates:

"Occasional periods of depression were treated with ample doses of sympathy and understanding. The student compensated by developing self-confidence and pride in her work. She successfully completed an internship in our cytology laboratory and is now employed. Her present position is an extremely desirable one."

However, two cases, both CLA students, that were not so satisfactory were described as follows:

"During the first 25 weeks she did nearly perfect work in the classroom and was only a little slower than average in lab work. However, when she got out into the hospital situation she had great difficulty in human relations and was confused under pressure. Clinical labs are not the best place for someone who is disorganized and who doesn't react well to pressure, and I frankly don't know where she will find employment. This is where the problem of the disabled lies, but they have to be given a chance to try. I do not regret having accepted her in the course, and I would be perfectly willing to have another student with a known disability."

"The disability that was brought to our attention was that of a knee injury, and I did not become aware of his emotional problem until some time after the course was underway. Everyone is now aware of it and we are watching him closely. During training he became very depressed and had to be hospitalized six weeks for psychiatric care. We counseled with him almost daily and he was allowed to complete the program. Three days after graduation he committed suicide. This was a shock to all of us on the faculty for it seemed to us that his spirits were high and he seemed proud that for once he had completed something he started ... In a training program of this type the pressures on the student are great, and the reluctance to take students with emotional problems is a well-founded one. That is why I think it is only fair to state that we were not aware of this problem at the beginning of the course."

(3) Training Related to Specific Disabilities

AMBULATORY

Almost without exception the students with ambulatory limitations did well in training. The students observed ranged all the way from a few with slight limps and curvature of the spine to paraplegics confined to wheelchairs. Most had moderately severe or severe impairments -- fifteen required crutches, braces or prostheses, and nine were partially or wholly dependent on wheelchairs. An additional eleven students were limited in the amount of standing or walking they could do. Three of the wheelchair paraplegics were medical technology graduates.

Type of Training	Disabled Students	Referred by VR	Graduated	Employed	Certified by ASCP Registry
Medical Technology	13	2	13	12	9 MT (ASCP)
Cytotechnology	15	2	14	13	11 CT (ASCP)
CLA	12	7	12	12	10 CLA
Histologic Technique	6	4	4	4	1 HT (ASCP)
On-the-Job	1	—	—	1	—
TOTALS	47	15	43	42	31

Training modifications: The schools did not find it necessary to modify training for these students, although some adjustments were made for some of the more severely disabled. Five of the medical technology trainees were not required to go out on the hospital floors to collect blood samples, although one student did do this in her wheelchair. Instead they learned to do venapunctures in the laboratory or got this experience in the out-patient laboratory. Lower laboratory benches were constructed for a few so they could do microscopic work while seated in their wheelchairs. However, bench height was no problem in many schools, and in only one case, that of a cytotechnology student, was any aspect of training omitted for this reason. Otherwise, aside from providing stools or boxes for some students to stand on and urging others who tired easily to sit while working as much as possible, the schools needed to make no concessions for this group of students.

The drop-outs: There were no real failures due to disability among the 47. Of the four who didn't graduate, one died of acute pneumonia during training, one did not complete the course because he failed to apply himself (due in part to 8 hours outside employment each day), and 2 are still in training, although one is not making good academic progress and has become "withdrawn".

AUDITORY

Practically all the deaf and hard of hearing students also did well. Two-thirds of the students were deaf-mutes, totally deaf or completely dependent on lip-reading for understanding. Two of the totally deaf were medical technology graduates.

Type of Training	Disabled Students	Referred by VR	Graduated	Employed	Certified by ASCP Registry
Medical Technology	3	1	3	3	3 MT(ASCP)
Cytotechnology	9	1	9	9	5 CT(ASCP)
CLA	4	3	2	2	
Histologic Technique	1		1	1	1 HT(ASCP)
Chemistry	1		1	1	
TOTALS	18	5	16	16	9

Training modifications: Training was modified for some but not all of the totally deaf, and many of the students required extra time and special attention from their instructors. Problems of communication were taken care of in various ways: In some schools lectures were typed and given to the students prior to delivery and verbal instructions were written out. One school substituted demonstrations for films, and in another a student was given extra work with a dual-viewing microscope. Most schools warned teachers to speak directly facing the students. However, there was no indication from any of the teaching supervisors that these modifications had unduly disrupted regular training routines.

The drop-outs: Only one student dropped out. (The other non-graduate is still in training). Her withdrawal was due to emotional immaturity rather than to her deafness or her academic progress.

MANIPULATIVE

All the students with manipulative problems completed training successfully except for those with tremor or shaking of their hands. Disabilities included minor limitations due to Polio, loss of manual dexterity because of Rheumatoid Arthritis, partial or complete impairment of one hand or arm, cerebral palsy and spastic paralysis of one side.

Type of Training	Disabled Students	Referred by VR	Graduated	Employed	Certified by ASCP Registry
Medical Technology	7		7	6	6 MT (ASCP)
Cytotechnology	1				
CLA	2				
Histologic Technique	2	1	1	1	
TOTALS	12	1	8	7	6

Training Modifications: In no case was training modified. Students with one "good" hand which had been used habitually since childhood had no problems. Others who were right handed with impairments to the right side needed practice to master certain procedures such as pipetting.

The drop-outs: Two of the four non-graduates are still in training, but two had to withdraw. One CLA student with cerebral palsy could not hold her hands steady and broke many objects, and a histology trainee with spastic paralysis of her left hand and arm could not handle the microtome (a sharp cutting instrument).

EMOTIONAL

Although all but two of the students successfully completed their training and some went through the year with no real difficulties, others had inter-personal problems, were overly rigid or became confused under pressure. Several needed special counseling from the laboratory staff and two were hospitalized for psychiatric care during training.

Type of Training	Disabled Students	Referred by VR	Graduated	Employed	Certified by ASCP Registry
Medical Technology	4		4	3	4 MT (ASCP)
Cytotechnology	1	1	1	1	1 CT (ASCP)
CLA	5	2	4	4	2 CLA
Histologic Technique	2	2	1	1	
TOTALS	12	5	10	9	7

Training modifications: Extra teaching sessions were needed for those who were hospitalized and special attention or counselling for others. Several teaching supervisors questioned whether people with such problems could neet the pressures of clinical laboratory work and all underscored the need for sympathetic understanding of such students.

The drop-outs: One student with a "personality" problem completed training but did not graduate because she failed basic chemistry; the other, who had left college because of psychological problems, simple dropped the course although he was doing well. And one of the CLA students committed suicide three days after he graduated.

CONVULSIVE SEIZURES

As a group the students with seizure disorders gave the poorest performance of all the disabled. Most of the students had Epilepsy which was controlled by medication, and in some cases the effect of medication was a handicap to the student, producing "lack of interest", "awkwardness and lack of motor control", and "lack of attentiveness." Only one of the students had several seizures during training, brought on by formal examinations. They ceased when the testing program was made more informal, and she graduated in medical technology with the highest grades in the history of the school and is employed in the Microbiology department. Training was not modified for any of the other students.

Type of Training	Disabled Students	Referred by VR	Graduated	Employed	Certified by ASCP Registry
Medical Technology	2	1	1	1	1 MT (ASCP)
Cytotechnology	1				
CLA	7	2	4	2	1 CLA
TOTALS	10	3	5	3	2

The drop-outs: Two students were terminated because of the effect or erratic control of medication; one for irresponsible behavior, one because he was mentally slow, and one medical technology student withdrew for personal reasons.

CARDIO-PULMONARY

Students with cardiac diseases went through training with practically no problems. Impairments included ventricular septal defects, rheumatic heart disease, open-heart surgery and rheumatic fever. Training was not modified for these students, although a student being trained on the job worked only part-time immediately after an open-heart operation. The only "drop-out" was a student whose heart condition was complicated by a past history of Uremia, possible goiter and mild anxiety.

Pulmonary disabilities included Asthma, Bronchiectasis, and Tuberculosis, and those students also required no modifications in training. One of the two students with Tuberculosis was unable to complete six weeks of training while the other graduated, found employment and is a registered CLA.

Type of Training	Disabled Students	Referred by VR	Graduated	Employed	Certified by ASCP Registry
Medical Technology	3		3	3	3 MT(ASCP)
Cytotechnology	1		1	1	
CLA	5	4	3	3	3 CLA
On-the-Job	1	1	1	1	
TOTALS	10	5	8	8	6

VISUAL

Minor visual impairments (congenital Ambliopia and crossed eyes) presented no problems, but students with more severe visual handicaps needed extra time and special attention during training. Two with loss of bilateral vision graduated from medical technology programs, quickly found employment and passed the certifying examination. Microscopic work periods were shortened and special attention was given when focusing or labelling and columns of figures caused problems. The only drop-out was a student with Corneal Cataract, who had trouble pipetting and collecting blood from patients.

Type of Training	Disabled Students	Referred by VR	Graduated	Employed	Certified by ASCP Registry
Medical Technology	3	1	3	3	3 MT(ASCP)
CLA	2		1		
TOTALS	5	1	4	3	3

OTHER DISABILITIES

Observation of nine students with a variety of other disabilities showed that most of the disabilities as such were not handicaps. Three of four diabetics successfully completed their courses, two in medical technology and one in cytotechnology. The fourth was dropped from a CLA program because she had disciplined herself poorly, was not under a physician's supervision and was absent an excessive amount due to illness.

Training was not modified for a young man with bilateral cleft palate who was well accepted in the laboratory and after graduation quickly found employment and became a registered MT(ASCP). Nor were there any real problems with a cytotechnology trainee with Hemorrhagic Blood Dyscrasia -- rare bleeding episodes were treated with fresh plasma, and she was satisfactorily employed as a student cytotechnologist during the last six months of training.

Three students did not complete CLA programs, one with Hashimoto's disease, one who had had brain surgery due to a gunshot wound and one who had had a Thyroidectemy. However only the first of these students had to withdraw because of illness.

(4) VR Involvement with Disabled Students

Only one-third of the 124 disabled students had been referred to the schools by VR agencies -- seven were in medical technology schools, four in cytotechnology schools, 22 in CLA schools and eight in histologic technique or other training. The small percentage of students who were VR clients and the even smaller percentage of VR clients in medical technology and cytotechnology training programs strengthened earlier project findings that most disabled individuals in the laboratory field have had no contact with rehabilitation agencies and that many rehabilitation counselors have inadequate knowledge of laboratory training requirements and are unaware of the schools approved by the medical profession where this training can be obtained.

It was impractical, if not impossible, to get overall information on the kind of laboratory training that has usually been given to VR clients interested in the field. However, a pilot survey of rehabilitation counselors in the District of Columbia showed that none had clients who were enrolled in AMA-approved schools. A spot check was also made in New Jersey and Pennsylvania by an examination of the DVR closure forms in two cities. The files on closed cases for 1965 were examined in Newark, New Jersey. Three clients were found who had been given laboratory training, none in AMA-approved schools. They included a forty year old divorcee with mental problems who was given three months' laboratory training in a commercial school and later employed as a laboratory technician at $60 a week; (2) a 22 year old with 1-1/2 years of college, who was sent to a commercial school for three months and later employed as a technician at $65 a week; and (3) a 38 year old alcoholic with schizophrenic reaction, who was admitted to a mental hospital where he was given laboratory training and was working there, earning $3,200 a year.

In Philadelphia, examination of 5,000 closure forms (January 1965 through February 1968) produced five clients trained for laboratory work: (1) a cerebral palsy victim with 18 months university training in cytotechnology, employed in a hospital for $85 a week; (2) a client with emotional problems given 18 months laboratory technician training, employed at a medical center for $56 a week; (3) Another cerebral palsy victim who took 16 months hospital laboratory technician training on her own, employed in a hospital for $69 a week; (4) a mental patient, who had been a medical corpsman in the Army, with a year's commercial training, employed at $95 a week; and (5) A client with psychiatric problems, with an IQ of 128 who had a medical discharge from the Navy, was trained at a commercial school and employed as a laboratory technician at $65 a week.

However, it was not until the demonstration program was started in Region II that the full extent of the communication gap between VR and the laboratory became apparent. For over a year intensive efforts were made to acquaint VR counselors with information about the medical laboratory field and the training opportunity for their clients offered by the project. When it became clear that a more direct approach was needed to stimulate the interest of the counselors, a series of local meetings with VR staff were held throughout the three states. Pathologists and medical technologist-teaching personnel from local hospitals were brought into each of these meetings so that specific job and training opportunities could be discussed.

The frank discussions at these meetings brought to light many of the reasons for misunderstanding between the two professional groups. Laboratory personnel indicated that disabled applicants to their schools often lacked the academic background for their particular training program and did not appear to have the motivation for this type of work. Counselors, on the other hand, reported that their clients were often stopped by the hospital personnel office the minute the disability was mentioned and that there was no opportunity to have their clients evaluated for future laboratory training although not yet qualified for the schools. The frequent questions at every meeting regarding the training in commercial schools indicated again how few counselors had had any contact with the hospital training schools approved by the medical profession, and the salary level of laboratory workers with this kind of professional training was a surprise to many counselors.

IV. SIGNIFICANCE OF FINDINGS AND IMPLICATIONS FOR ACTION

It is too soon to measure the effectiveness of the project in attracting more disabled persons to medical laboratory work. Because of the three year college requirement for medical technology training, a substantial increase in VR referral of students to these schools could not be expected before 1970 or 71 since the big effort to publicize the project's findings nationally was not started until late in 1967. However there are several indications that more rehabilitation counselors are sending their clients to AMA-approved schools for training, and that there is increased interest and willingness on the part of laboratory directors to train and employ the disabled.

In order to measure results, two surveys were made of approved schools: the first in August 1967 regarding disabled students enrolled during the 1966-67 and the 1967-68 school years, and the second in April 1969 regarding disabled students enrolled during 1968-69. Of the 1069 AMA-approved schools (784 Medical Technology, 107 Cytotechnology and 178 CLA), 62% of the schools replied to the 1967 survey and 50% to the 1969 survey.

Within the three year period there has been an upward trend in the number of schools training disabled students and a marked increase in the percentage of VR-referred students. In the 1966-67 school year, 17% of the disabled students were referred by VR; during the following two school years (1967-8 and 1968-9) over 42% were VR-referred students. Exact enrollment figures are shown on the following table:

AMA-Approved Schools with Disabled Students

	Medical Technology	Cyto-technology	CLA	Totals
1966-67				
Schools with VR-referred students	2	0	4	6
Schools with other disabled students	12	11	5	28
TOTALS	14	11	9	34
1967-68				
Schools with VR-referred students	7	3	7	17
Schools with other disabled students	11	4	7	22
TOTALS	18	7	14	39
1968-69				
Schools with VR-referred students	10	1	12	23
Schools with other disabled students	21	6	4	31
TOTALS	31	7	16	54

The above figures do not tell the whole story. There is no question but that more schools are becoming involved in training disabled students. Of the 53 schools with such trainees this past year, 37 schools had not had disabled students in previous years. Moreover an additional 19 schools had applicants who were VR clients. Nearly half the applicants were turned down because they lacked the necessary educational background. Only two were turned down because of physical disability and two because laboratory conditions were too crowded. The other eight were rejected because of emotional instability or lack of motivation.

Communication between rehabilitation and laboratory personnel is definitely improving. This has been more noticeable where counselors have met personally with the pathologists and medical technologists in their area to discuss respective needs. During 1967 such meetings were held in every DVR district in New York. A DVR survey of counselors' caseloads in May 1969 showed that 95 clients have started on educational programs leading to medical laboratory careers. Of these, seven are now enrolled in AMA-approved schools, 21 are completing their college pre-requisites in 1969, and 18 will complete them in 1970, 24 in 1971 and 25 in 1972.

- - - - - -

There is undoubtedly a place for the disabled in medical laboratories. They have proved it both on the job and under close observation during training. The hospital environment is one that most "handicapped" individuals are familiar with and comfortable in, and for the most part, the teachers and supervisors in the laboratory have shown that they have more than ordinary sympathy for the disabled person.

Laboratory directors who have had no experience with disabled employees and students may underestimate their capabilities and their ingenuity in compensating for their limitations. They may not understand how local VR centers operate -- how they screen and test clients and how they give vocational evaluation. Counselors need to see the laboratory environment so as to relate it to their clients' limitations.

On the other hand, rehabilitation counselors still lack a good understanding of the training needed for jobs in today's medical laboratory and many do not know about the laboratory training schools approved by the medical profession and the academic background needed for entrance.

Everything in our study has pointed to the importance of personal contact between the two professional groups at the local level. This may be particularly important in rural areas where it is sometimes difficult to keep the well-trained laboratory worker -- the handicapped person may prefer to find a job near his home. It may also be significant in helping the returning veteran. And in general we believe this is the key to steering more disabled persons to the laboratory jobs that are waiting for them.

PART TWO: DETAILED FINDINGS OF TWO RESEARCH STUDIES ON DISABLED EMPLOYEES

V. NATIONAL HOSPITAL SURVEY

Profile of Survey

In order to find out how and where the disabled are being utilized in laboratories at the present time, a comprehensive inquiry regarding the employment of disabled individuals in technical and professional laboratory jobs within the last three years was addressed to laboratory directors in the 7,123 hospitals in the country that are accredited by the American Hospital Association. At the same time a companion survey was made of hospital administrators regarding personnel policies on employing the disabled.

Replies were received from 1,531 Hospital Administrators and from 1,984 laboratory directors. In these returns 475 hospital laboratories were found employing 767 disabled workers. Because the information from 32 laboratories was incomplete they were omitted from the study. The data which was analyzed and processed by computer came from 443 hospitals with a total of 693 disabled employees.

Major findings of the two surveys included the following:

Initial Finding

1. Hospital Administrators and Laboratory Directors Favor the Employment of Qualified Disabled Workers.

Of the 1,531 hospital administrators who responded to the survey, 915 reported that their institutions had a positive policy of hiring the disabled. Seven administrators reported policies against the employment of disabled workers. 1,157 administrators said they had satisfactory experience with disabled employees, and 38 reported unsatisfactory experience. Administrators from 27 different states commented on the lack of disabled applicants for hospital jobs.

Of the 1,984 laboratory directors who sent replies, 475 reported that they had disabled employees in the laboratory. Of the 1,509 who had no disabled employees, nearly 200 added special comments, most of which favored the training and recruitment of disabled workers. Directors from 34 states reported that no disabled person had ever applied for a job. Below are a few sample comments:

> "I believe this is an excellent job opportunity for certain types of handicapped persons, especially since the types of work are varied and the demand far exceeds the supply."
>
> Laboratory Director - Alabama

"Only one basis for hiring staff, COMPETENCE. No disabled workers presently employed, but none have ever applied."
Hospital Administrator - California

"The only reason we have not employed handicapped personnel is that we have had no qualified applicants."
Laboratory Director - Georgia

"We have not had the opportunity to judge the efficiency of disabled individuals. None, to my knowledge have applied for work at our hospital. We would like to try some."
Laboratory Director - Chicago

"We strongly favor employment of qualified disabled workers. It has been our experience that if the handicap does not apply to the specific competence required by the work in question, the handicapped employees may be more productive and involve less turnover than employees without handicaps."
Hospital Administrator - Iowa

"Supervisors of this lab are 100% in favor of utilizing physically disabled persons...We feel that few other careers are so well suited to the...effective utilization of persons in this category."
Laboratory Director - Kansas

"Laboratory work requires reasonable good eyesight and major control of the hands and arms. I would not hesitate to employe disabled persons who can meet the requirements."
Laboratory Director - Missouri

"There is no reason why such people could not be successful in this field."
Laboratory Director - North Carolina

"We have discussed hiring handicapped persons and made provisions for them in our job descriptions, but have had no applications."
Laboratory Director - Minnesota

"Hiring procedures are based on qualifications only. If a person is physically handicapped but can do the job --- this is all we ask."
Hospital Administrator - Pennsylvania

"Yes -- where do you find such people? I'm sure we -- and many others -- would find a place for them."
Laboratory Director - Wisconsin

"We have many tasks in the laboratory that can be performed by persons with varying degrees of disability."
Laboratory Director - Texas

Only 35 of the 693 disabled laboratory employees had been referred to their jobs by vocational rehabilitation agencies, according to the reports received. Whether there was any VR involvement in the training of some of the remaining 658 employees is not known since no specific question was asked on this point.

For the most part, the employees referred by VR were trained at a lower level (only 20% had been trained as medical technologists; whereas 43% of the whole sample had this type of training). More were working at the lowest job level (60% were only laboratory assistants as compared to 28.3% of the whole sample). Jobs had been modified for a somewhat larger percent, 31.4% as compared to 19.6%. However, their performance on the jobs they held was on a par with all laboratory assistants in the study. However, the significance of these findings is limited since the number of VR referrals was so small.

Initial Finding

2. Disabled Persons are Employed in Every Part of the Country, in All Types of Hospitals and All Sizes of Laboratories.

Replies to the survey were received from hospitals in every state in the union, and in all but three (Delaware, Nevada and Vermont) disabled workers were being employed in hospital laboratories. The percentage of hospitals in the states responding varied from a low of 7.7% in Alaska to a high of 42.9% in the District of Columbia. Over one-fifth of the hospitals in every state with the exception of Alabama, Alaska, Arkansas and Texas sent replies, and in 24 states over 30% of the hospitals responded.

The percentage of hospitals employing the disabled also varied from state to state, from a low of 2% in Oregon and Mississippi to a high of 19% in the District of Columbia. (See Appendix C, Geographic Distribution of Hospitals with Disabled Laboratory Employees

Disabled workers were found to be employed in every type of hospital: non-profit, proprietary, federal and governmental, non-federal. Most of them were employed in non-profit hospitals, which account for over half the hospitals in the country. 1,235 of these hospitals (34%) sent replies and 312 (9%) reported disabled laboratory employees. The smallest response came from proprietary hospitals, 112 of which (11%) replied with 14 (1%) reporting disabled workers. However, the proportionate number of disabled employees in each type of institution seemd to indicate that the type of hospital control did not make a substantial difference in the disabled person's chances of employment -- i.e., 70.4% of the hospitals in the study were non-profit hospitals and 71.6% of all disabled employees were working in non-profit hospitals; 7.2% of the hospitals were federal and 7.6% of the disabled were working in federal hospitals. (See Appendix D, Table I and Table II

Laboratories of all sizes are employing the disabled, from the smallest that perform under 50,000 tests per year to the largest where

over 500,000 tests are done a year. A positive correlation was found between the size of laboratory and number of disabled individuals employed. (See Appendix D, Table III)

Initial Finding

3. Individuals With Every Type of Medical Disability are Doing Satisfactory Work in Medical Laboratories.

Disabilities were divided into seven basic types on the survey forms. In order to see if there were patterns in the utilization of different disability types, laboratory directors were asked to mark all the categories in which each employee had limitations.

The 693 employees were found to have medical disabilities of all types, divided as follows: 309 (40.6%) ambulatory; 118 (15.4%) manipulative; 29 (3.7%) visual; 60 (7.9%) auditory; 56 (7.3%) cardio-pulmonary; 38 (5.0%) convulsive seizures; 85 (11.1%) recovered mental; and 69 (9.0%) "other". The 764 total is due to the fact that 71 of the 693 employees proved to have more than one type of disability. (See Appendix E for breakdown of multiple disabilities).

A comparison of these figures with the numbers of handicapped persons rehabilitated in State-Federal vocational rehabilitation programs in 1965 showed a higher proportion of people with ambulatory and manipulative limitations in laboratory work (56%) than there were among total rehabilitated cases of these types (33.9%) a slightly higher percentage of auditory (8% as compared with 6% of total rehabilitated cases), and a smaller percentage of people with visual handicaps (3.7% in laboratory work as compared to 9.6% among total rehabilitated cases). Proportionate numbers in the other disability categories were more closely comparable. (See Appendix F).

Over nine-tenths of the 693 disabled were rated as satisfactory workers by their laboratory directors. This is approximately the percentage of non-disabled laboratory workers that might have been rated satisfactory in the opinion of the pathologists and medical technologists on the project's Advisory Committee.

There was some variation in performance between people in different disability categories, although only three -- manipulative, convulsive seizures and recovered mental -- fell much below the average of 91.3% satisfactory workers for the whole sample. The breakdown is indicated as follows:

	All Disabled Employees*	Satisfactory Disabled Employees	
Ambulatory	304	287	(94.4%)
Manipulative	116	97	(83.6%)
Visual	28	25	(89.3%)
Auditory	59	55	(93.2%)
Cardio-Pulmonary	55	51	(92.7%)
Convulsive Seizures	36	29	(80.6%)
Recovered Mental	82	68	(83.0%)
Other	68	62	(91.2%)

* The totals of all disabled employees include only those employees whose work was specified as satisfactory or unsatisfactory.

Initial Finding

4. Disabled Persons of Every Type Have Been Trained Successfully After Disability.

In order to get a general indication of how disabled employees had been trained, five types of laboratory training were listed on the survey form:

Medical Technology - MT(ASCP) Certification

This 4-year collegiate program includes 1 year in an AMA-accredited hospital school. Graduates are eligible for certification by the American Society of Clinical Pathologists.

Cytotechnology - CT(ASCP) Certification

After 2 years of college and 1 year in an AMA-Approved hospital school a person is eligible for ASCP certification.

Certified Laboratory Assistant - CLA Certification

This fairly new 1-year training program is offered in hospital schools approved by the CLA Board of the ASCP and is open to high school graduates.

Histologic Technique - HT(ASCP) Certification

Certification by the ASCP can be obtained after 1 year's training under a pathologist in an approved hospital's

clinical laboratory. Open to high school graduates.

Other

College training and/or commercial school training and/or on-the-job training.

Because of inconsistencies in the use of the terms "technologist", "technician" and "laboratory assistant", it was not entirely clear from the survey whether all disabled employees listed in the first four categories had been trained at levels approved by the medical profession. Even so, it seemed significant that 43% of the disabled employees had been trained as Medical Technologists.

Even more significant was the fact that 72% of all the disabled in the sample had received their laboratory training after becoming disabled. The majority of persons in every disability category had been trained at this time with the single exception of recovered mental, only 34% of whom were trained after disability.

The complete breakdown is shown below:

	All Disabled	Disabled Employees Trained After Disability	
Ambulatory	313	243	(77.3%)
Manipulative	121	101	(83.5%)
Visual	30	20	(66.7%)
Auditory	59	50	(84.7%)
Cardio-Pulmonary	55	34	(61.6%)
Convulsive Seizures	38	28	(73.7%)
Recovered Mental	89	30	(33.7%)
Other	70	53	(76.8%)

Initial Finding

5. Disabled Individuals are Doing Satisfactory Work in All Major Areas of the Laboratory at All Job Levels.

Some disabled individuals were found to be working in every area of the laboratory, and the percentage of satisfactory workers did not vary significantly in the various departments. A complete tabulation follows:

	All Employees	Satisfactory Employees	
4 or more depts.	120	114	(95%)
bacteriology	155	143	(92%)
blood bank	139	134	(96%)
cytotechnology	53	47	(89%)
hematology	245	227	(93%)
histology	100	91	(91%)
mycology	43	43	(100%)
parasitology	75	74	(99%)
physics	10	10	(100%)
radio isotopes	8	8	(100%)
serology	118	112	(95%)
urinalysis	199	181	(91%)
other (includes chemistry)	225	204	(91%)

The breakdown by job level was 130 supervisors (98.5% satisfactory), 356 staff (92.7% satisfactory), 192 assistants (84.7% satisfactory). A further breakdown of these figures was made by disability type to see whether any disability was utilized to a significantly greater degree in some areas of the laboratory. However, no clear pattern was found. In fact, some disabled of every type were found in every laboratory department with a few exceptions.*

Detailed Analysis of 428 Satisfactory Disabled Laboratory Employees

After the initial analysis of the survey data explained in preceding sections, a further look was taken at the satisfactory professional employees to see if more precise patterns of utilization (of different types of disabled) could be found. Unsatisfactory employees were excluded because it was felt that the placement of employees whose work was satisfactory would be a better indication of which laboratory areas are most suitable for people with different physical and emotional limitations. Laboratory assistants were also excluded because for the most part they do routine tasks which vary little from department to department; whereas a study of the professionals responsible for the laboratory tests would show which disabilities are compatible with the physical processes and instrumentation required in different parts of the laboratory.

* In cytotechnology there were no convulsive seizures; in physics there were no auditory, convulsive seizures, or recovered mental; and in radio isotopes there were no manipulative, auditory or convulsive seizures.

The 428 satisfactory workers have been divided into 4 groups: staff workers trained before disability; staff workers trained after; and supervisors trained before, and supervisors trained after. The distribution by type of disability is indicated below. Individuals with multiple disabilities were counted either in the "Ambulatory-Manipulative" category or in the "more than 1 disability" category.

DISTRIBUTION BY DISABILITY TYPE OF 428 SATISFACTORY DISABLED WORKERS

	STAFF		SUPERVISORS		
	Trained Before	Trained After	Trained Before	Trained After	Total
Ambulatory	35	92	8	46	181
Manipulative	3	32	5	9	49
Visual	3	7	1	1	12
Auditory	4	18	4	2	28
Cardio-Pulmonary	3	14	8	8	33
Convulsive Seizures	5	6	0	0	11
Recovered Mental	30	5	3	1	39
Other	10	22	2	3	37
Ambulatory-Manipulative	2	14	3	1	20
More than 1 Disability	3	9	2	4	18
TOTAL	98	219	36	75	428

The distribution of the 428 employees by laboratory department is shown in the charts below:

1. DISTRIBUTION OF 98 STAFF WORKERS TRAINED BEFORE DISABILITY

		0 5% 10% 15% 20% 25% ⟶ 100%
Bacteriology	(11)	XXXXXXXXXXXX
Blood Bank	(2)	XX
Cytotechnology	(4)	XXXX
Hematology	(18)	XXXXXXXXXXXXXXXXXXXX
Histology	(3)	XXX
Mycology		
Parasitology		
Physics	(1)	X
Radio Isotopes		
Serology	(1)	X
Urinalysis	(4)	XXXX
Other*	(21)	XXXXXXXXXXXXXXXXXXXXXXXXXX
2-3 depts.	(13)	XXXXXXXXXXXXX
4 or more depts.	(20)	XXXXXXXXXXXXXXXXXXXXXXXXX
Total	98	

* Including Chemistry

2. DISTRIBUTION OF 219 STAFF WORKERS TRAINED AFTER DISABILITY

		0 5% 10% 15% 20% 25% ⟶100%
Bacteriology	(12)	XXXXXXX
Blood Bank	(6)	XXXX
Cytotechnology	(15)	XXXXXXXX
Hematology	(22)	XXXXXXXXXXX
Histology	(28)	XXXXXXXXXXXXXXXX
Mycology		
Parasitology	(1)	XX
Physics	(1)	XX
Radio Isotopes		
Serology	(4)	XXXX
Urinalysis	(4)	XXXX
Other*	(34)	XXXXXXXXXXXXXXXXXXXX
2-3 depts.	(40)	XXXXXXXXXXXXXXXXXXXXXXXX
4 or more depts.	(52)	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Total	219	

* Including Chemistry

3. DISTRIBUTION OF 36 SUPERVISORS TRAINED BEFORE DISABILITY

		0 10% 20% 30% 40% ⟶100%
Bacteriology	(2)	XXXX
Blood Bank	(1)	XX
Cytotechnology	(1)	XX
Hematology	(1)	XX
Histology	(6)	XXXXXXXXXXX
Mycology		
Parasitology		
Physics		
Radio Isotopes		
Serology		
Urinalysis	(1)	XX
Other*	(14)	XXXXXXXXXXXXXXXXXXXXXXXX
2-3 depts.	(2)	XXXXX
4 or more depts.	(8)	XXXXXXXXXXXXX
Total	36	

* Including Chemistry

4. DISTRIBUTION OF 75 SUPERVISORS TRAINED AFTER DISABILITY

		0 5% 10% 15% 20% 25% 100%
Bacteriology	(7)	XXXXXXXXXXX
Blood Bank	(4)	XXXXXXX
Cytotechnology	(6)	XXXXXXXXXX
Hematology	(6)	XXXXXXXXXX
Histology	(10)	XXXXXXXXXXXXXX
Mycology		
Parasitology		
Physics	(1)	XX
Radio Isotopes		
Serology	(1)	XX
Urinalysis	(1)	XX
Other*	(11)	XXXXXXXXXXXXXXXXXXX
2-3 depts.	(13)	XXXXXXXXXXXXXXXXXXXXXXX
4 or more depts.	(15)	XXXXXXXXXXXXXXXXXXXXXXXXXX
Total	75	

* Including Chemistry

The absence of disabled workers in certain laboratory departments is not an indication that these areas are unsuitable for the handicapped. In many laboratories several specialties are often included in one large department. Parasitology, bacteriology and mycology are sometimes combined in one department of microbiology, and serology and blood bank are also often combined. In small hospitals there may be no physics or radio isotopes departments, and in others they are often combined.

There are no reliable comprehensive figures on the distribution of laboratory personnel by section or department within the hospital laboratory framework. In general, however, most medium-sized and large laboratories have departments in the following areas: bacteriology, blood bank, chemistry, cytology, hematology, histology, serology and urinalysis. In small hospitals, on the other hand, approximately 30-40 different routine laboratory procedures will be performed by a very small staff. Employees in such institutions are required to do a great deal more "running around", taking blood from patients, bringing specimens to the laboratory, etc. than are employees in large institutions where assistance from other hospital personnel (internes, IV teams etc.) is available. In this connection it is interesting that 74 of the 693 disabled employees in the total sample were working in small laboratories doing less than 50,000 tests per year. These included all disability types, and 58 were working at the staff or supervisory level.

Essentially what these charts show is that all types of disabled are working in all areas of the laboratory. It should be noted that a large proportion of the disabled work in 2 to 3 departments or in 4 or more departments. This was true for all disability types.

The chart below gives the complete breakdown.

	Total Sample	2 - 3 departments	4 or more departments
Ambulatory	(181)	29	31
Manipulative	(49)	10	15
Visual	(12)	1	2
Auditory	(28)	6	8
Cardio-Pulmonary	(33)	5	10
Convulsive Seizures	(11)	2	1
Recovered Mental	(39)	4	8
Other	(37)	5	10
Amb. - Man.	(20)	3	3
More than 1 disability	(18)	3	7

Of greatest significance to both VR and laboratory officials are the staff workers who were trained after disability (219 out of 428). Therefore, a complete breakdown of this group by disability and laboratory department is contained in Appendix G.

Special Study of the Deaf

Since the Hospital Survey provided no information on the degree or severity of disability of the 693 employees, it was decided to conduct a follow-up inquiry with one disability category. The deaf were chosen for further study for several reasons: the total number of employees with auditory limitations was sufficiently small to make individual follow-up feasible; the disability seemed to present special problems at the training level; and finally, the chairman of the Advisory Committee, Thomas M. Peery, M.D., brought specialized experience to the study as Director of another project, a Cytotechnology Training Program for the Deaf, which is being carried out at George Washington University in cooperation with Gallaudet College. (See Appendix H).

Sixty persons with auditory limitations were reported in the hospital survey. Of these, five had other additional disabilities, four were unsatisfactory workers, and one return contained insufficient information. A study was made of the remaining 50 satisfactory workers with a single auditory disability by means of a special survey form and personal letter to each employee's laboratory director. Detailed information was received on 34 of the 50.

Findings:

The most surprising finding was the discovery that nearly half of the group were totally deaf. Most had either been totally deaf since birth or had no residual hearing as the result of childhood illness. The total breakdown was as follows:

Employees	Amount of Residual Hearing
16	None
5	10%
3	10% - 25%
5	25%
4	50%
1	75%

Most of the 34 had successfully completed laboratory training courses in AMA - approved hospital schools, and all but 2 of the 34 had been trained after disability. Particularly significant was the fact that 8 of the 16 totally deaf were ASCP-certified medical technologists (7 trained after disability) and 3 totally deaf were enrolled (and doing well) in approved cytotechnology schools. The complete breakdown follows:

Employees	Type of Laboratory Training
17	Medical Technology (15 were certified MT(ASCP)'s, 1 eligible for certification and 1 enrolled in AMA-approved school)
4	Cytotechnology (all in AMA-approved schools)
4	Histologic Technique (all certified HT (ASCP)'s)
9	On the job training

The majority were also found to have jobs of responsibility. Three were supervisors (1 totally deaf) and 19 were regular staff members (7 totally deaf). Only 7 were laboratory assistants, and the remaining 5 were students in AMA-approved schools. They were working in every area of the laboratory; 13 exclusively in one department and the remaining 21 had responsibilities in more than one department. The distribution is shown on the following table:

Employees in One Department (13)

- 1 - bacteriology
- 3 - chemistry
- 4 - cytotechnology
- 1 - hematology
- 4 - histology

Employees in Several Departments (21)

- 13 - bacteriology
- 6 - blood bank
- 10 - chemistry
- 4 - cytotechnology
- 15 - hematology
- 5 - histology
- 4 - mycology
- 7 - parasitology
- 9 - serology
- 3 - radio isotopes
- 16 - urinalysis

Jobs had been modified for only 10 of the 35, and in most cases the modification involved relieving the employee from telephone duties. Laboratory directors reported that nearly all of the 35 were able to communicate adequately for the job by means of lip-reading (all but 2 of the 35 could lip-read), hearing aids and pad and pencil.

Wide variation was found in the sizes of the laboratories employing the 34. Three of the deaf were in small laboratories that do less than 50,000 tests per year; four were in laboratories where more than 500,000 tests are performed a year; and the remaining 27 were in medium-sized laboratories.

The 34 were also found to be working in all sizes of towns and cities: 8 in towns of less than 20,000 population; 11 in cities of over 500,000 and the remaining 15 in large towns and small cities.

Most of the 34 were completely satisfactory employees according to their laboratory directors. The work of 26 was rated as 100% satisfactory as compared to that of non-disabled in the same positions, and only 1 employee was rated as less than 75% satisfactory.

An Ohio pathologist commented thus on a certified histologic technician on his staff: "This exceptional and talented person is a complete deaf mute.... and we could use a dozen like her. We did not sympathize with her or show any favoritism or partiality."

A Pittsburgh pathologist had trained another deaf-mute on the job through lip reading and text books. "She had proven to be an excellent technician," he wrote, "I have recently trained her in cytology screening."

Two other totally deaf employees have left their jobs to do graduate work, one, an ASCP-certified medical technologist, to finish her Ph.D.

Another totally deaf person who was a summer employee in a Massachusetts hospital is now enrolled in an AMA-accredited school of medical technology. Her pathologist wrote: "We plan to hire Nancy as a full-time technologist when she completes her training. She said that she isn't limited during her training, sees patients, and moves through all departments."

VI. INTERVIEW STUDY OF 54 DISABLED HOSPITAL LABORATORY EMPLOYEES

Profile of the Study

An intensive in depth study was made of 54 disabled laboratory employees, to get detailed information on how people with different types of medical disabilities had succeeded in meeting the emotional and physical demands of various kinds of jobs in the medical laboratory.

The 54 were chosen from among 147 disabled employees reported in the Hospital Survey returns from New Jersey, New York and Pennsylvania. The sample was selected on the basis of the national distribution of types of disabilities reported in the Hospital Survey, and it included disabled employees in both large and small hospitals as well as employees in community, city, state and federal hospitals. Geographically the survey covered a belt stretching across the states of New Jersey, New York and Pennsylvania in length, and from Poughkeepsie, New York to Neptune, New Jersey in width.

Twenty-four hospitals were visited, ten of which had AMA-accredited schools of medical technology. The case histories were obtained on the 54 disabled employees by interviewing the worker himself, his immediate supervisor and his pathologist-employer. The project's Field Investigator Mrs. Catherine Milos, MT(ASCP), who had worked for five years as a vocational rehabilitation counselor after long experience as a chief medical technologist and teaching supervisor in an AMA-approved school of medical technology, did the interviewing assisted by two part-time occupational therapists, both of whom had worked in rehabilitation centers.

The disabilities of the 54 included ambulatory (25), manipulative (6), mental illness (6), cardio-pulmonary (4), auditory (4), cerebral palsy (3), epilepsy (3), and dwarfs (3). Investigation of 2 employees with visual limitations showed that the disability was not really handicapping and did not prevent the workers from using a microscope. They were therefore omitted from the study.

Findings:

In the main the study confirmed the major findings of the Hospital Survey. People with nearly all types of disability are working in clinical laboratories. Many have had a high level of professional training. In general they are not restricted to a particular type of laboratory work. Most are considered satisfactory workers by their employers and very little job modification has been necessary. Only a small percent have had assistance from VR agencies.

In one important respect, however, the general conclusions of the Hospital Survey must be modified by the more detailed information obtained in the second study: severity of handicap and, to a certain extent, type of disability were found to be an important element in the way the disabled were utilized in the laboratory.

1. Training

All but 10 of the 54 had had some formal education beyond high school:

13 had taken some college work, 25 had bachelor's degrees, 5 had master's degrees, and there was 1 Ph.D. in chemistry. Among this group there were 15 who had also taken medical technology training in AMA-accredited hospital schools and 1 who had been trained in cytotechnology at an approved school. Three had received commercial school training which had been supplemented by on-the-job training as laboratory assistants. Those with collegiate degrees but no formal laboratory training had usually received some training on the job.

Many of the disabled workers reported real difficulty breaking into the laboratory field, but said that once they had been trained and had a recommendation from a pathologist getting employment was no problem. Most of the pathologists interviewed mentioned the need for more college graduates -- all but two said their laboratories were under-staffed -- and several suggested that the disabled should have above minimum training so they could compete more equally with the non-disabled. One of the employees, who supervised a bacteriology department from a wheelchair, voiced the same thought: "The severely handicapped person needs an extra weapon, and that weapon is a better education than someone else has."

DVR had been involved in the training of only 6 of the 54, 4 college trained supervisors (3 of them certified medical technologists), and 2 assistants (1 trained in a commercial school and 1 trained on the job). Many of the other 48 seemed to be unaware of the assistance available in VR agencies.

2. Employment Records and Salaries

Nearly every employer attested to the fact that the disabled worker tends to stay longer on the job. Of the 54, 21 had been employed in the same laboratory more than 6 years, and 8 of these had been in the same job for more than 15 years. Their attendance records (sick leave and absenteeism) were equal to and in many cases superior to those of their non-disabled co-workers according to their laboratory directors.

The salaries of the 54 corresponded to those paid to the non-disabled employees doing similar work in the same hospital laboratory: 42 were earning between $5,000 and $8,000; six earned under $5,000; and six earned over $8,000. The three highest salaries ($10,000 to $12,000) were paid to workers who had to use crutches to get around the laboratory. All three had master's degrees, had been working in their present positions more than 15 years, and were in charge of laboratory sections staffed with from eight to 25 workers.*

3. Job Responsibilities

In general, the disabled were not restricted to a particular type of laboratory work. The 54 were scattered through the following laboratory departments: bacteriology, blood bank, chemistry, cytology, hematology, histology, neuro-histology, serology, urinalysis and electrocardiograms. Some were also in general supervisory and teaching positions and some were general laboratory assistants. However, there was more job specialization for them than for the non-disabled, and in most cases care had been taken to see that the laboratory position was compatible with the disability.

The severity of disability and, to a certain extent, the type of

* It should be noted that these salary figures were obtained early in 1966. Since that time salaries for most laboratory workers have risen considerably.

disability seemed to be an important element in laboratory assignments. Pathologists classified 18 of the group as minimally disabled, 18 as moderately disabled and 18 as severely disabled. All of the severely disabled were working exclusively in one department with the exception of two assistants who did selected simple tasks in more than one department. Most of this group had only received training in the area they were working in, and none could function as general medical technologists because of the limitations imposed by their disabilities. The only ones who worked alone were those in histology, and cytology where most of the work can be done sitting down. None could have served as the only person in a laboratory because their disabilities might have prevented an adequate response to an emergency.

This group of 18, all but two of whom were satisfactory workers, included two spastics, two deaf mutes, two with mental illness, a paraplegic, a war casualty (100% VA disability), an epileptic, one with cerebral palsy and another with convulsive seizures, two manipulative, one a left arm amputee, one asthmatic, and one rheumatoid arthritis. Three had ambulatory problems: one with polio affecting both legs, one with congenital dislocated hips and one with congenital Spina Bifida.

All of the moderately disabled were satisfactory workers; seven were supervisors in contrast to the two severely disabled in this position. Two were in general teaching and administrative positions and three were working in blood banking or hematology, in contrast to the severely disabled none of whom had these responsibilities. The minimally disabled had the largest number (6) working in more than one department, and six of the group were in supervisory positions.

There were indications that type of disability bore some relation to laboratory assignment. Those with more severe ambulatory disabilities tended toward working in bacteriology, cytotechnology and histology. When laboratory assignments were divided between (1) those that required less moving around (bacteriology, cytology, histology, and serology) and (2) those that required more moving around (blood banking, chemistry, electrocardiograms, hematology, teaching and administration, and general assignment), it was found that more of the severely disabled of all types fell in (1) and more of the minimally disabled of all types fell in (2). (See Appendix I for complete breakdown).

Pathologists generally considered ambulatory and cardio-pulmonary disabilities as less handicapping for clinical laboratory work than disabilities that involved difficulty in communication (auditory and mental illness) or problems with fine manipulations (cerebral palsy and spastics, convulsive seizures, manipulative, and dwarfs.) The whole sample was divided into those who had difficulty with their hands, those who had difficulty with communication, and those who had difficulty moving around. Most of the group fell into the third category. (See Appendix J).

Those with manipulative disabilities had been tested at the time of interview with dynamometer to ascertain strength of grasp and with pinch guage to ascertain strength of opposing thumb and forefinger. While the findings represented a wide range of capability in both areas, the disabled with manipulative difficulties were without exception found to have at least one hand with the capacity to achieve scores comparable to non-disabled working in the laboratory.

	GRASP				PINCH			
	Left hand		Right hand		Left hand		Right hand	
	high	low	high	low	high	low	high	low
Disabled	100	30	116	27	26	8	26	2½
Non-Disabled	164	30	170	30	32	7	37	5

4. Job Modification

Although many of the disabled were working in one department, there was very little job modification. The deaf were exempted from telephone duties. Pressures were taken off those with mental illness on the "bad days", and one was given a room to work in alone. An epileptic's work load was lightened when medication slowed down his production. Few were asked to be on weekend duty or on night call alone.

On the other hand, the workers exhibited great ingenuity in finding ways to minimize their handicaps. Some had sewed their uniform pockets so test tubes of liquids could be carried upright in them. Others had devised special racks for carrying laboratory equipment that could be attached to crutches or wheelchairs. Dwarfs carried their stools with them.

5. Evaluation of Disabled Employees' Work

Nine-tenths of the 54 were considered good or adequate workers by their laboratory directors. With the six unsatisfactory employees the disability itself was usually not the prime cause of dissatisfaction, but rather the employee's emotional attitude. A congenital spastic being trained in cytology was finally discharged because of failure to accept her own limitations. Her supervisor's comment was "If it had not been for the personality problems, I feel we could have trained her for the job, but she felt the world was against her." Another who had to be discharged was severely handicapped with rheumatoid arthritis involving every joint. Unable to sit down she worked from a leaning board that jutted out into the laboratory aisle, and everything she used had to be brought to her. Her motions were awkward, and it was hard for her to control spilling even with a single test tube. Although a careful worker, she was compulsive and a perfectionist. Her supervisor's comment: "She would not accept her limitations... She thought she could do more than she could and was a danger to herself and others."

However, these were the exceptions. Nearly all the disabled in the study were considered useful workers in the positions they held as the following comments from their superiors attest:

Polio (minimal disability): medical technologist - "She is able to perform all duties of the M.T. position excellently."

Manipulative (left arm amputated below elbow): chemistry supervisor - "He could work alone in chemistry if required to."

Congenital Cerebral Palsy (severe disability): doing EKG's - "He is very concientious, and on days when he is slow, will stay to finish work. Would consider a similar disability for same responsibilities."

Polio (cane, leg brace - can stand only briefly): working alone in cytotechnology - "She is a terrific screener... better than non-disabled (in quantity and quality of work)."

Auditory (can hear in face-to-face conversations): MT(ASCP) - "Disability does not affect technical competence in any way."

Severe ambulatory (crutches): bacteriology staff - "Capable of all technical procedures in department....would be glad to employ a similarly disabled person."

APPENDIX A

DISABLED STUDENTS TRAINED IN AMA-APPROVED SCHOOLS

Ambulatory Disabilities

1. Atrophy of left leg and limp - Polio (female,21). Graduated from School of Medical Technology, employed, registered MT(ASCP). VR referral.

2. Short stature, Milwaukee brace for support - Polio (female, 24). Graduated from School of Medical Technology, employed, registered MT(ASCP). VR referral.

3. Spinal fusion - Polio (male, 25). Graduated from School of Medical Technology.

4. Short stature and weak left leg, cannot stand long - Polio (male, 24). Graduated from School of Medical Technology, employed, registered MT(ASCP)

5. Deformed, very short legs and limp - birth injury (female, 22). Graduated from School of Medical Technology, employed.

6. Dependent on crutches and wheelchair - Polio (female, 21). Graduated from School of Medical Technology, employed, registered MT(ASCP).

7. Very short stature, leg brace - Polio (female, 21). Graduated from School of Medical Technology, employed, registered MT(ASCP).

8. Leg brace and Canadian walking stick, cannot stand long - Polio (female, 21). Graduated from School of Medical Technology, employed, registered MT(ASCP).

9. Curvature of spine - congenital (male, 22). Graduated from School of Medical Technology, employed.

10. Confined to wheelchair (can manage for short periods with leg braces) Polio (female, 22). Graduated from School of Medical Technology, employed.

11. Confined to wheelchair - Polio (female, 24). Graduated from School of Medical Technology, employed, registered MT(ASCP).

12. Multiple scoliosis, limp, curvature of spine - Polio (female, 22). Graduated from School of Medical Technology, employed, registered MT(ASCP)

13. Rheumatoid Arthritis (surgery, partial hip prothesis with Smith Petersen cup), limited motion in right hip, slow pace (female, 23). Graduated from School of Medical Technology, employed.

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14. Arthritis (lumbar spine), uses brace and cane, cannot sit for long (male, 46). Graduated from School of Cytotechnology. VR referral.

15. Ruptured vertebral disc, prohibiting excessive standing, walking or lifting (male, 42). Graduated from School of Cytotechnology, employed, registered CT(ASCP)

16. Dependent on leg brace, 2 crutches - Polio (female, 30). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

17. Paraplegic limited to wheelchair - Polio (female, 25). Graduated from School of Cytotechnology, employed, registered CT(ASCP). VR referral.

18. Paraplegic confined to wheelchair - Automobile accident (male, 26). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

19. Paraplegic with braces, 90% confined to wheelchair - Polio (female, 24). In School of Cytotechnology. Died during training from acute pneumonia.

20. Paraplegic confined to wheelchair, limited movement in left hand and arm - Polio (female, 24). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

21. Requires crutches - Polio (female, 22). Graduated from School of Cytotechnology, employed.

22. Confined to wheelchair - congenital deformities of both legs (female, 22). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

23. Cannot stand or walk long - progressive osteoporesis following surgery for World War II wounds (male, 40). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

24. Requires braces and crutches, cannot stand long - Polio (female, 22). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

25. Moves and walks very slowly - Rheumatoid Arthritis (male, 25). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

26. Paraplegic totally confined to wheelchair (male, 30). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

27. Post traumatic spastic, partial paraplegia (25% use of right arm & leg, 90% of left), requires drop feet braces and cane - automobile accident (male, 30). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

28. Paraplegic, requires braces and crutches - Polio (female, 22). Graduated from School of Cytotechnology, employed.

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29. Cannot stand or walk long - Polio (female, 24). Graduated from School for Certified Laboratory Assistants, employed, registered CLA.

30. Ankylosed knees, flexion and extension of joints inhibited, cannot stand erect long, right hand does not open voluntarily - Rheumatoid Arthritis (female, 24). Graduated from School for Certified Laboratory Assistants, employed, registered CLA. VR referral.

31. Neck and back injury (female, 21). Graduated from School for Certified Laboratory Assistants, employed, registered CLA. VR referral.

32. Ex-polio - no handicap (female, 21). Graduated from School for Certified Laboratory Assistants, employed.

33. Loss of leg (artificial limb), cannot stand in one position long (female, 21). Graduated from School for Certified Laboratory Assistants, employed, registered CLA. VR referral.

34. Chronic Osteomyelitis (right tibia, healed), wears surgical stockings (female, 35). Graduated from School for Certified Laboratory Assistants, employed, registered CLA.

35. Short stature, withered leg, bad limp - Polio (female, 18). Graduated from School for Certified Laboratory Assistants, employed, registered CLA.

36. Leg injuries - fall from roof (male, 34). Graduated from School for Certified Laboratory Assistants, employed, registered CLA. VR referral.

37. Crushed feet (corrected with triple arthrodesis), cannot stand long - automobile accident (female, 34). Graduated from School for Certified Laboratory Assistants, employed, registered CLA. VR referral.

38. Back injury (smashed vertebrae), lifting or standing for long difficult (female, 51). Graduated from School for Certified Laboratory Assistants, employed, registered CLA. VR referral.

39. Curvature of spine - surgery not effective (female, 20). Graduated from School for Certified Laboratory Assistants, employed, registered CLA.

40. Requires crutches - Spina Bifida (female, 20). Being trained in Histologic Technique, but may not be kept on because of poor academic performance, emotional withdrawal and excessive absence. VR referral.

41. Unable to lift heavy objects, tires on prolonged standing - broken back (female, 29). Graduated from School for Certified Laboratory Assistants, employed. VR referral.

42. Weak left leg and restricted motion of spine (needs long leg brace and 2 lefstrand crutches for ambulation) - Polio (male, 23). Completed training in histologic technique, employed, VR referral.

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43. Congenital absence of right leg (female, 20). Completed training in Histologic Technique, employed.

44. Cannot stand long - Spina Bifida (deviation of vertebral column) right leg shorter than left, (female, 25). Completed training in Histologic Technique, employed, registered HT(ASCP).

45. Cannot stand long - Muscular Dystrophy, (female, 49). Completed training in Histologic Technique, employed. VR referral.

46. Partial paralysis of leg - Polio (male, 29). Unable to finish training in Histologic Technique because of lack of application and outside employment.

47. Requires leg braces - Muscular Dystrophy, (male, 23). Being trained on job as Medical Laboratory Technician, employed.

Auditory Disabilities

48. Bilateral hearing loss - uses hearing aid, reads lips (male, 20). Graduated from Medical Technology School, employed, registered MT(ASCP). VR referral.

49. Deaf mute - does not read lips (male). Graduated from School of Medical Technology, employed.

50. Totally deaf - lip reads, speaks beautifully, (female, 27). Graduated from School of Medical Technology, employed, registered MT(ASCP).

51. Congenital Deaf Mute - does not read lips (female, 25). Graduated from School of Cytotechnology, employed, registered CT(ASCP). VR referral.

52. Totally deaf for 30 years - lip reads, able to speak well (male, 45). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

53. Bilateral nerve deafness - proficient lip reader, can speak (female, 25). Graduated from School of Cytotechnology, employed.

54. Totally deaf since birth, reads lips (female, 22). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

55. Deaf - must read lips (female, 30). Graduated from School of Cytotechnology, employed.

56. Deaf - uses hearing aid (female). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

57. Totally deaf (male). Graduated from School of Cytotechnology, employed, registered CT(ASCP).

58. Deaf - uses hearing aid (female). Graduated from School of Cytotechnology, employed.

59. Deaf - uses hearing aid (male). Graduated from Cytotechnology School, employed.

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60. Hearing impairment and speech defect - reads lips (female, 21). Graduated from School for Certified Laboratory Assistants, employed. VR referral.

61. Hard of hearing - uses hearing aid and reads lips (female, 20). Now enrolled in School for Certified Laboratory Assistants, making good progress. VR referral.

62. Loss of hearing in one ear (other ear corrected with hearing aid), speech difficulty (female, 19). Withdrew from School for Certified Laboratory Assistants after 4 months because of emotional immaturity. Work was satisfactory.

63. Complete loss of hearing in right ear (female, 19). Graduated from School for Certified Laboratory Assistants, employed.

64. Totally deaf since birth (female, 24). Completed training in Histologic Technique, employed, registered HT(ASCP).

65. Congenital deafness and accompanying dysphonia - depends on lip reading for understanding (male, 27). Completed ASCP-approved training in Chemistry, employed.

Manipulative Disabilities

66. Slight impairment of right side - Polio (female, 21). Graduated from School of Medical Technology, employed, registered MT(ASCP).

67. Relatively mild Cerebral Palsy, involving use of right arm and leg (female, 21). Graduated from School of Medical Technology, employed.

68. Moderate difficulty walking, moderate crippling of hands with some loss of dexterity - Diabetes and Rheumatoid Arthritis (female, 22). Graduated from School of Medical Technology, registered MT(ASCP).

69. Limited ability to lift and reach - birth injury to muscles of right shoulder (female, 21). Graduated from School of Medical Technology, employed, registered MT(ASCP).

70. First and fourth fingers of right hand missing - congenital (female, 22). Graduated from School of Medical Technology, employed, registered MT(ASCP).

71. Difficulty walking, lack of manual dexterity - Rheumatoid Arthritis, (female, 23). Graduated from School of Medical Technology, employed, registered MT(ASCP).

72. Right arm and shoulder of very little use (left hand unusually strong) - Polio (male, 24). Graduated from School of Medical Technology, employed, registered MT(ASCP).

73. Weakness of left arm, shoulder and face, speech impediment - Polio (female, 22). Now enrolled in School of Cytotechnology. To be employed after graduation.

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74. Little use of right arm, unable to hold hands steady - congenital right hemiparesis, cerebral palsy (female, 19). Withdrew from School for Certified Laboratory Assistants after 4 months because she lacked manual dexterity to do the work.

75. Myesthenia Gravis - mild, under control (female, 21). Now enrolled in School for Certified Laboratory Assistants, to be employed after graduation.

76. Rheumatoid Arthritis affecting both hands and feet (female, 23). Completed training in Histologic Technique, employed.

77. Spastic paralysis of left hand and arm (female, 39). Withdrew from Histologic Technique training after 4 months because she was unable to handle small materials and the microtome and could not relate to instructors. VR referral.

Emotional Disabilities

78. Nervous breakdown during college - 6 weeks hospitalization (female, 26). Graduated from School of Medical Technology, employed, registered MT(ASCP).

79. Mental illness (female, 27). Graduated from School of Medical Technology, not employed (married), registered MT(ASCP).

80. Mental illness (female, 24). Graduated from School of Medical Technology, employed, registered MT(ASCP).

81. Mental illness (female, 22). Graduated from School of Medical Technology, registered MT(ASCP).

82. Psychological problem (female, 27). Graduated from School of Cytotechnology, employed, registered CT(ASCP). VR referral.

83. Emotional problem - hospitalized 6 weeks for psychiatric care during training (male, 26). Graduated from School for Certified Laboratory Assistants. Three days later committed suicide. VR referral.

84. Schizophrenia - breakdown in 1964 (female, 27). Graduated from School for Certified Laboratory Assistants.

85. Alcoholic (female, 51). Graduated from School for Certified Laboratory Assistants, employed (part-time under supervision), registered CLA.

86. Personality problem (female, 22). Finished course in School for Certified Laboratory Assistants but did not graduate because she failed basic chemistry, employed.

87. Emotional problem (female, 34). Graduated from School for Certified Laboratory Assistants, employed, registered CLA. VR referral.

88. Arthritis and nervous breakdown (female, 44). Completed training in Histologic Technique, employed.

89. Psychological problem (male, 25). Dropped out of Histologic Technique training after 3 months. VR referral.

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Convulsive Seizures

90. Seizures of emotional origin - 4 school-age children to support (female, 38). Withdrew from School of Medical Technology because the responsibilities of home and study were too much for her.

91. Post-traumatic Grand Mal seizures with Jacksonian features (female, 41). Graduated from School of Medical Technology, employed, registered MT(ASCP). VR referral.

92. Epilepsy (Grand Mal) controlled by medication (male, 25). Terminated by School of Cytotechnology at end of 6 months (without prejudice) because his reaction to medication produced lack of motor coordination causing awkwardness.

93. Petit Mal seizures, under good control (male, 22). Dropped out of School for Certified Laboratory Assistants after 2 months - mentally slow, could not comprehend, repeated mistakes.

94. Epilepsy (Petit Mal seizures) controlled by medication (female, 20). Termimated by School for Certified Laboratory Assistants at end of 8 months because of physical condition (erratic control of medication) on advice of personal physician.

95. Epilepsy, controlled by medication - last seizure 15 years ago (male, 30). Graduated from School for Certified Laboratory Assistants, employed. VR referral.

96. Epilepsy (female, 19). Graduated from School for Certified Laboratory Assistants, did not accept offered job.

97. Post-traumatic seizures from childhood (female, 22). Graduated from School for Certified Laboratory Assistants.

98. Epilepsy (Grand Mal), medicated (female, 22). Terminated by School for Certified Laboratory Assistants at end of 5 months because of excessive absence, irresponsible behavior and lack of academic progress. VR referral.

99. Epilepsy, medicated (female, 18). Graduated from School for Certified Laboratory Assistants, employed, registered CLA.

Cardio-Pulmonary Disabilities

100. Ventricular septal defect (male, 23). Graduated from School of Medical Technology, employed, registered MT(ASCP).

101. Ventricular septal defect and pulmonary hypertension (female, 23). Graduated from School of Medical Technology, employed, registered MT(ASCP).

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102. Asthma (female, 40). Graduated from School of Medical Technology, employed, registered MT(ASCP).

103. Bronchiectasis - shortness of breath and coughing (female, 23). Graduated from School of Cytotechnology, employed.

104. Tuberculosis - Mycobacteriosis, pulmonary (female, 38). Enrolled in School for Certified Laboratory Assistants in 2 successive years, unable to complete a full 6 weeks either time. VR referral.

105. Heart murmur, Uremia 5 years previously, mild anxiety (female, 37). Withdrew from School for Certified Laboratory Assistants at end of 3 months because of recurrent illness. VR referral.

106. Rheumatic Fever (hospitalized few weeks at age 13 and age 17), functional capacity limited (female, 18). Graduated from School for Certified Laboratory Assistants, employed, registered CLA. VR referral.

107. Tuberculosis (female, 21). Graduated from School for Certified Laboratory Assistants, employed, registered CLA. VR referral.

108. Rheumatic heart disease (female, 18). Graduated from School for Certified Laboratory Assistants, employed, registered CLA.

109. Aortic Stenosis - Aortic valve replaced (male, 21). Completed special 1-year, MDTA laboratory assistant course, employed. VR referral.

Visual Disabilities

110. Little useful vision in 1 eye, depth perception imperfect (female, 20). Graduated from School of Medical Technology, employed, registered MT (ASCP). VR referral.

111. Loss of bilateral vision, difficulty in focusing (male, 23). Graduated from School of Medical Technology, employed, registered MT(ASCP).

112. Congenital Ambliopia (female, 21). Graduated from School of Medical Technology, employed, registered MT(ASCP).

113. Crossed eye, correctable to 20/20 (male, 21). Graduated from School for Certified Laboratory Assistants.

114. Corneal Cataract (female, 17). Withdrew from School for Certified Laboratory Assistants at end of 4 months - unsatisfactory progress, had trouble pipetting.

"Other" Disabilities

115. Diabetes Mellitus (male, 24). Graduated from School of Medical Technology, registered MT(ASCP). VR referral.

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116. Diabetes (male, 22). Graduated from School of Medical Technology, registered MT(ASCP). VR referral.

117. Bilateral cleft palate - congenital (male, 22). Graduated from School of Medical Technology, employed, registered MT(ASCP). VR referral.

118. Diabetes - detected after childbirth (female, 27). Graduated from School of Cytotechnology, employed.

119. Hemorrhagic Blood Cyscrasia due to Factor VIII deficiency (female, 21). Student in School of Cytotechnology, employed as student cytotechnologist.

120. Diabetes Mellitus (female, 20). Enrolled in School for Certified Laboratory Assistants, terminated after 5 months because of poor discipline in care of her diabetes and anti-social behavior. VR referral.

121. Hashimoto's disease with Anemia, duodenal ulcer (female, 37). Enrolled in School for Certified Laboratory Assistants, withdrew after 11 weeks on recommendation of her physician.

122. Thyroidectomy (female, 42). Enrolled in School for Certified Laboratory Assistants, withdrew after 6 weeks because subject matter was distasteful. VR referral.

123. Brain surgery - accidental gunshot wound (female, 20). Enrolled in School for Certified Laboratory Assistants, withdrew after 5 months for personal reasons. VR referral.

124. Aplastic Anemia - requires one blood transfusion per week (Male). Enrolled in Histologic Technique training program.

APPENDIX B

AMA-APPROVED SCHOOLS THAT TRAINED DISABLED STUDENTS

Alabama
Gadsden, Holy Name of Jesus Hospital, School of Cytotechnology

Arizona
Tucson, Tucson Medical Center, School of Medical Technology

California
San Diego, Mercy Hospital, School of Medical Technology
San Francisco, University of California School of Medicine, School of Cytotechnology
San Jose, Santa Clara Valley Medical Center, School of Medical Technology
Stockton, San Joaquin General Hospital, Chool of Medical Technology

Colorado
Colorado Springs, Penrose Hospital, School of Medical Technology
Denver, University of Colorado School of Medicine, School of Medical Technology

Connecticut
Derby, Griffin Hospital School of Laboratory Assistants
Hartford, Hartford Hospital, School of Cytotechnology
New Haven, Yale University, School of Cytotechnology

District of Columbia
George Washington University, School of Cytotechnology
Providence Hospital, School of Medical Technology

Florida
Orlando, Valencia Junior College, School for Certified Laboratory Assistants (formerly Wymore Vocational Technical Center at Maitland)
St. Petersburg, St. Anthony's Hospital, School for Certified Laboratory Assistants
Tampa, Adult Technical School Certified Laboratory Assistants Program

Georgia
Atlanta, Grady Memorial Hospital, School of Medical Technology
Augusta, University of Georgia, School of Medical Technology
Macon, Macon Hospital, School of Medical Technology
Thomasville, Archbold Memorial Hospital, School for Certified Laboratory Assistants

Illinois
Chicago, Northwestern University Medical School, School of Medical Technology
Chicago, University of Chicago, Hospitals and Clinics, School of Cytotechnology
Evergreen Park, Little Company of Mary Hospital, School for Certified Laboratory Assistants

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Oak Park, Oak Park Hospital, School for Certified Laboratory Assistants

Indiana
Fort Wayne, St. Joseph's Hospital, School of Medical Technology
Indianapolis, Indiana Vocational-Technical College, Medical Laboratory Assistants Program
Indianapolis, Thornton-Haymond-Costin-Buehl School for Medical Laboratory Asssistants
South Bend, South Bend Medical Foundation, School of Medical Technology
Terre Haute, Terre Haute School of Laboratory Assistants

Iowa
Bettendorf, Eastern Iowa Community College, Davenport Vocational-Technical Center

Kansas
Wichita, St. Francis Hospital, School of Medical Technology

Kentucky
Ashland, King's Daughters' Hospital, School for Certified Laboratory Assistants

Louisiana
New Orleans, Charity Hospital, School of Cytotechnology

Maryland
Baltimore, Mercy Hospital, School of Medical Technology

Massachusetts
Boston, Northeastern University-Hinton Course for Medical Laboratory Assistants

Michigan
Dearborn, Oakwood Hospital, School of Medical Technology
Detroit, Harper Hospital, School of Cytotechnology
Detroit, Sinai Hospital, School of Medical Technology
Grand Rapids, Butterworth Hospital, School of Medical Technology

Minnesota
Minneapolis, University of Minnesota Hospitals, School of Medical Technology
St. Paul, St. Joseph's Hospital, School of Medical Technology
St. Paul, St. Paul-Ramsey Hospital, School of Medical Technology

Montana
Billings, St. Vincent Hospital, School of Medical Technology

Nebraska
Omaha, University of Nebraska Hospital, School of Cytotechnology

New Jersey
Perth Amboy, Perth Amboy General Hospital, School for Certified Laboratory Assistants
Summit, Overlook Hospital, School of Medical Technology

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New York
Albany, Albany Medical Center, School of Medical Technology
Buffalo, Roswell Park Memorial Institute, School of Cytotechnology
New York City, St. Vincent's Hospital, School of Medical Technology
Poughkeepsie, Vassar Brothers Hospital, School for Certified Laboratory Assistants

North Carolina
Charlotte, Presbyterian Hospital, School of Cytotechnology
Winston-Salem, North Carolina Baptist Hospital and Bowman Gray School of Medicine, School of Medical Technology

Ohio
Warren, Trumbull Memorial Hospital, School of Medical Technology
Youngstown, St. Elizabeth's Hospital,Schools of Medical Technology and Cytotechnology
Youngstown, Youngstown Hospital Association, School of Medical Technology

Oklahoma
Ada, Valley View Hospital, School of Medical Technology
Oklahoma City, University of Oklahoma Medical Center, School of Cytotechnology

Oregon
Portland, University of Oregon Medical School Hospitals and Clinics, School of Medical Technology

Pennsylvania
Camp Hill, Holy Spirit Hospital, School for Certified Laboratory Assistants
Harrisburg, Harrisburg Hospital, School for Certified Laboratory Assistants
Harrisburg, Harrisburg Polyclinic Hospital, School for Certified Laboratory Assistants
Natrona Heights, Allegheny Valley Hospital, School for Certified Laboratory Assistants
Philadelphia, Temple University Hospital
Philadelphia, J.F. Kennedy Hospital, School for Certified Laboratory Assistants
Pittsburgh, Pittsburgh Board of Public Education, School for Certified Laboratory Assistants

Rhode Island
North Providence, Institute of Pathology-Our Lady of Fatima-St. Joseph's Hospitals, School of Cytotechnology
Providence, Rhode Island Hospital, School of Cytotechnology

South Carolina
Columbia, South Carolina Baptist Hospital, School of Medical Technology

South Dakota
Watertown, Memorial Hospital, School for Certified Laboratory Assistants

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Tennessee
Jackson, Jackson-Madison County General Hospital, School of Medical Technology
Knoxville, University of Tennessee Memorial Research Center and Hospital, School of Cytotechnology
Memphis, University of Tennessee, Institute of Pathology, School of Cytotechnology

Texas
Beaumont, Baptist Hospital of Southeast Texas, School of Medical Technology
Dallas, Parkland Memorial Hospital, School of Medical Technology
Houston, St. Joseph's Hospital, School of Medical Technology
Port Arthur, Park Place Hospital, School for Certified Laboratory Assistants
San Angelo, Shannon West Texas Memorial Hospital, School of Medical Technology

Utah
Salt Lake City, Holy Cross Hospital, School of Cytotechnology
Salt Lake City, Latter Day Saint's Hospital, School of Medical Technology

Vermont
Rutland, Rutland Hospital Inc, School for Certified Laboratory Assistants

Virginia
Norfolk, Norfolk General Hospital, School for Certified Laboratory Assistants
Roanoke, Lewis-Gale School for Certified Laboratory Assistants

Washington
Lakewood Center, Clover Park Vocational Technical School, School for Certified Laboratory Assistants
Seattle, King County Hospital, School of Cytotechnology
Seattle, University of Washington School of Medicine, School of Medical Technology

West Virginia
Charleston, Charleston General Hospital, School of Cytotechnology
Huntington, Saint Mary's Hospital, School for Certified Laboratory Assistants

APPENDIX C

GEOGRAPHIC DISTRIBUTION OF HOSPITALS WITH DISABLED LABORATORY EMPLOYEES

	Hospitals Surveyed	Hospitals Responding		Hospitals with Disabled*	
Alabama	144	26	(18%)	5	(4%)
Alaska	26	2	(8%)	1	(4%)
Arizona	80	23	(29%)	6	(8%)
Arkansas	84	14	(17%)	1	(2%)
California	627	144	(23%)	43	(7%)
Colorado	92	31	(34%)	6	(7%)
Connecticut	69	29	(42%)	3	(4%)
Delaware	16	6	(38%)	0	(---)
D.C.	21	9	(43%)	4	(19%)
Florida	173	41	(24%)	9	(5%)
Georgia	146	29	(20%)	6	(4%)
Hawaii	33	11	(33%)	2	(6%)
Idaho	51	14	(28%)	3	(6%)
Illinois	333	102	(31%)	29	(9%)
Indiana	139	39	(28%)	8	(6%)
Iowa	137	44	(32%)	6	(4%)
Kansas	157	52	(33%)	7	(5%)
Kentucky	137	39	(29%)	8	(6%)
Louisiana	146	32	(22%)	7	(5%)
Maine	58	20	(35%)	3	(5%)
Maryland	86	23	(27%)	5	(6%)
Massachusetts	204	64	(31%)	20	(10%)
Michigan	255	79	(31%)	17	(7%)
Minnesota	205	52	(25%)	8	(4%)
Mississippi	108	23	(21%)	2	(2%)
Missouri	142	34	(24%)	11	(8%)
Montana	62	15	(24%)	2	(3%)
Nebraska	113	36	(32%)	13	(12%)
Nevada	21	8	(38%)	0	(---)
New Hampshire	37	13	(35%)	1	(3%)
New Jersey	143	57	(40%)	19	(13%)
New Mexico	59	15	(25%)	3	(5%)
New York	457	129	(28%)	43	(9%)
North Carolina	167	44	(26%)	9	(5%)
North Dakota	63	13	(21%)	4	(6%)
Ohio	256	104	(41%)	27	(11%)
Oklahoma	139	28	(20%)	6	(4%)
Oregon	87	24	(28%)	2	(2%)
Pennsylvania	324	124	(38%)	36	(11%)
Rhode Island	25	9	(36%)	2	(8%)
South Carolina	78	24	(31%)	5	(6%)
South Dakota	61	23	(38%)	2	(3%)
Tennessee	150	35	(23%)	9	(6%)
Texas	556	106	(19%)	21	(4%)
Utah	39	14	(36%)	3	(8%)
Vermont	32	11	(35%)	0	(---)
Virginia	127	38	(30%)	7	(6%)
Washington	132	44	(33%)	11	(8%)
West Virginia	91	21	(23%)	3	(3%)
Wisconsin	201	57	(28%)	13	(7%)
Wyoming	34	10	(29%)	2	(6%)

*Percentages based on all hospitals in state.

APPENDIX D

DISTRIBUTION OF DISABLED EMPLOYEES IN HOSPITALS

I. TYPES OF HOSPITALS THAT EMPLOY DISABLED PERSONS IN THE LABORATORY

	Hospitals Surveyed	Hospitals Responding		Hospitals with Disabled	
Non-Profit	3,670	1,235	(34%)	312	(9%)
Proprietary	969	112	(11%)	14	(1%)
Federal	443	133	(30%)	31	(7%)
Governmental, non-federal	2,041	290	(14%)	59	(3%)
(Not specified)		214			
TOTALS	7,123	1,984	(26%)	443	(6%)

II. DISTRIBUTION OF DISABLED EMPLOYEES AMONG HOSPITALS OF DIFFERENT TYPES

Type of Hospital Control	Hospitals	% of Total Sample	Disabled Employees	% of Total Sample
Non-Profit	312	70.4%	496	71.6%
Proprietary	14	3.1%	17	2.4%
Federal	31	7.2%	53	7.6%
Governmental, non-federal	59	13.3%	94	13.5%
(Not specified)	27	6.0%	33	4.9%
TOTALS	443	100.%	693	100.%

III. DISTRIBUTION OF DISABLED EMPLOYEES AMONG DIFFERENT SIZED LABORATORIES

Size of Laboratory (No. of Lab Tests Performed per year)	Hospitals	% of Sample	Disabled Employees	% of Sample
Under 50,000	57	12.9%	74	10.7%
50,000 - 200,000	183	41.3%	250	36.1%
200,000 - 500,000	125	28.2%	228	32.9%
Over 500,000	34	7.7%	82	11.8%
(Not Specified)	44	9.9%	59	8.5%
TOTALS	443	100.%	693	100.%

APPENDIX E

BREAKDOWN OF MULTIPLE DISABILITIES IN 693 DISABLED EMPLOYEES

(e.g. of 38 employees with convulsive seizures, 5 also had ambulatory disabilities, 6 had manipulative disabilities and 1 was a recovered mental).

		Amb	Man	Vis	Aud	C-P	C S	R M	Other
Amb	309		40	3	1	1	5	7	7
Man	118	40		1	0	0	6	2	2
Vis	29	3	1		1	2	0	0	0
Aud	60	1	0	1		0	0	0	3
C-P	56	2	0	2	0		0	0	0
C S	38	5	6	0	0	0		1	0
R M	85	7	2	0	0	0	1		1
Other	69	7	2	0	3	0	0	1	

Amb - Ambulatory

Man - Manipulative

Vis - Visual

Aud - Auditory

C-P - Cardio-pulmonary

C S - Convulsive Seizures

R M - Recovered Mental

APPENDIX F

DISABILITY TYPE OF LABORATORY EMPLOYEES COMPARED WITH THAT OF TOTAL PERSONS REHABILITATED IN U. S.

Disability type of Laboratory Employees found in NCCMT Hospital Survey, November 1965

	Number	%
Manipulative	118	15.4
Ambulatory	309	40.6
Visual	29	3.7
Auditory	60	8.0
Recovered Mental	85	11.1
Cardio-pulmonary	56	7.3
Convulsive Seizures	38	5.0
Other	69	9.0
	764	

Most if not all completed high school, a high proportion 2 or more years of college

Disabling Condition of Total Persons Rehabilitated in U.S. in 1965, VRA, Division of Statistics and Studies*

	Number	%
Amputation or absence of upper extremities	2,438	1.8
Orthopedic deformities or impairments of upper extremities	4,373	3.2
Amputation or absence of lower extremities	6,501	4.8
Amputation or absence of upper & lower extremities	63	.05
Orthopedic deformities or impairments of lower extremities	12,947	9.6
Orthopedic deformities or impairments of upper & lower extremities & trunk	13,716	10.2
Orthopedic deformities or impairments of other parts of body	5,818	4.3
Blind in both eyes	5,450	4.0
Other visual impairments	7,616	5.6
Deaf, unable to talk	1,660	1.2
Deaf, able to talk	900	0.7
Other impairments of hearing	5,570	4.1
Impaired speech	1,590	1.2
Psychosis & psychoneurosis	12,804	9.5
Personality, character & behavior disorders	5,492	4.1
Mental retardation or deficiency	10,248	7.6
Cardiac diseases	5,552	4.1
Tuberculosis, pulmonary	4,332	3.2
Epilepsy	2,832	2.1
Disabling conditions, N.E.C.	24,895	18.7
	134,859	

35% completed 11-12 years of school
6.8% completed 13 years or more

*SOURCE: Characteristics and Trends of Clients Rehabilitated in Fiscal Years 1962-1966. U. S. Department of Health, Education and Welfare, Vocational Rehabilitation Administration, Division of Statistics and Studies, Washington, D.C.

APPENDIX G

DISTRIBUTION AMONG LABORATORY DEPARTMENTS OF 219 SATISFACTORY STAFF WORKERS TRAINED AFTER DISABILITY

	Amb#	Man	Vis	Aud	C-P	C S	R M	Other	Amb-Man	More 1	Total
Bact #	7	3							1	1	12 (5.5%)
Bl.Bk	5							1			6 (2.7%)
Cyto	7	1					2	1	4		15 (6.8%)
Hematol	10	4		2		1		4	1		22 (10%)
Hist	14	1	2	3	2	2	1	2	1		28 (12.8%)
Mycol											0 -
Parasit							1				1 (.5%)
Phys								1			1 (.5%)
Rad. Iso											0 -
Serol	1	1				1			1		4 (1.8%)
Urin	2							1	1		4 (1.8%)
Other*	13	6	3	1	4	1		3	1	2	34 (15.5%)
2-3 depts	16	5	1	6	3	1		4	3	1	40 (18.3%)
4 or more	17	11	1	6	5		1	5	1	5	52 (23.7%)
Total	92	32	7	18	14	6	5	22	14	9	219 (100%)

* Including Chemistry

Key

Amb - Ambulatory
Man - Manipulative
Vis - Visual
Aud - Auditory
C-P - Cardio-Pulmonary
C S - Convulsive Seizures
R M - Recovered Mental

Amb-Man - Ambulatory-Manipulative
More 1 - More than 1
Bact - Bactericlogy
Bl. Bk. - Blood Bank
Cyto - Cytology
Hematol - Hematology
Hist - Histology

Mycol - Mycology
Parasit - Parasitology
Phys - Physics
Rad. Iso. - Radio Isotope
Serol - Serology
Urin - Urinalysis
4 or more - 4 or more depts.

APPENDIX H

A CYTOTECHNOLOGY TRAINING PROGRAM FOR THE DEAF
at
George Washington University and Gallaudet College

Summary Report of a Project Supported by the Public Health Service, U.S. Department of Health, Education and Welfare

Thomas M. Peery, M.D., Project Director

Purpose:

An increasing awareness of the importance of cytological studies for the detection of early cancer and the consequent expanding need for trained cytotechnologists prompted this study. Cytotechnology is an especially suitable field for the deaf since there is little need for direct verbal or telephonic communication.

Program Procedures:

Students at Gallaudet College who have chosen biology as a major are admitted to the program on February 1 of their senior year. Their time henceforth is divided between regular classes at Gallaudet and special courses in Cytotechnology at George Washington University for which credit is given at Gallaudet.

In June students start full-time training at George Washington University. At the completion of 8-months training in the cytotechnology laboratory they are eligible to take the ASCP certifying examination.

Instruction is in the sign language, and much use is made of teaching aids such as kodachrome slides of selected microscopic fields, special slide study sets, specialiy prepared mimeographed instruction sheets and texts.

Results to date:

This year's class*, the largest to date, had four students enrolled. All completed the course successfully and all were placed in jobs prior to graduation. The 1968 program will probably have 7 students enrolled.

Nearly all graduates of this program have passed the registry examination and are certified CT(ASCP)'s. All but one, who is doing graduate work, are employed full-time in cytotechnology laboratories.

* (1967)

Histology	1 dwarf 1 smashed hips 1 polio (limp)	1 mental illness 1 rheum. arthrit. 1 polio (leg atrophy)	2 deaf mutes 1 war casualty 1 disloc. hips
Cytology	---	1 polio (leg brace)	1 spastic 1 spina bifida
Bacteriology	1 polio (crutches) 1 polio (limp)	1 mental illness 1 polio (brace&cane) 1 polio (crutches) 1 osteomyelitis	1 polio(crutches) 1 mental ill. & petit mal 1 rheumatoid arth. 1 paraplegic
Serology	---	1 congenital anomaly (no fingers, rt. hand)	---
Totals*	5	9	10

Require Less Moving Around

EKG's	---	---	2 epileptics
Hematology	1 polio(slight limp) 1 mental illness (in good remission)	1 auditory (some verbal communication) 1 infectious hepatitis (chronic fatigue)	---
Chemistry	1 polio (1 good arm) 1 convulsive seizures (none in lab) 1 dwarf	1 rheumatoid arth. 1 auditory (hears face to face)	1 mental illness 1 manipulative (left arm amp.) 1 convulsive seiz. 1 asthma (often absent)
Blood Bank	1 polio (crutches) 1 open-heart surgery	1 polio (leg atrophy)	---
Teaching & Administration	---	1 war casualty (multiple injuries) 1 polio (limp) plus melanoma, right eye	---
More than 1 Department	1 manipulative (1 good hand) 1 polio (leg atrophy) 1 T.B. (lobectomy) 1 T.B. (chronic, much fibrosis) 1 polio (weakness, arm and leg) 1 varicose veins	2 dwarfs 1 mental illness	2 spastics (assts.) 1 congenital anomaly (1 good hand)
Totals*	13	9	6

Require More Moving Around

* Note the oppostie direction of the totals for minimal, moderate, and severe when work areas are divided into those requiring less and those requiring more moving around - i.e. fewer of the severely disabled worked in areas that required more movement.

APPENDIX J

SEVERITY OF FUNCTIONAL DIFFICULTIES OF 54 EMPLOYEES IN RELATION TO THEIR AREA OF WORK

	Minimal Disability	Moderate Disability	Severe Disability
1. Difficulty with Hands			
Cerebral Palsy & Spastic	--	--	1 cytology 1 electrocardiogram 1 general assistant
Convulsive seizures	1 chemistry	--	1 chemistry 1 electrocardiogram
Manipulative	1 chemistry 1 histology 1 general	1 serology 1 admin.& teach.	1 chemistry 1 general assistant
Dwarfs	1 chemistry 1 histology	1 general	--
TOTALS	6	3	7

(Employees who had difficulty with fine manipulations were considered by pathologists to be more handicapped for laboratory work than those with ambulatory and cardio-pulmonary limitations.)

2. Difficulty with Communication			
Auditory	--	2 hematology	2 (deaf mutes) histol.
Mental Illness	1 hematology	1 bacteriology 1 histology 1 chemistry	1 bacteriology 1 chemistry
TOTALS	1	5	4

(Employees with severe difficulties in communication or getting along with others were limited to laboratory departments where they could work largely alone.)

3. Difficulty in Moving Around			
Ambulatory	1 general	1 admin.& teach.	1 bacteriology
Polio	1 bacteriology 1 histology 1 blood bank 2 hematology	2 bacteriology 1 histology 1 blood bank 1 cytology	(uses crutches)
Dislocated hips	1 histology	--	1 histology (crutches)
Varicose Veins	1 general	--	--
War Casualty	--	--	1 histology (requires transport)
Infectious Hepatitis	--	1 hematology	--
Rheumatoid Arthritis	--	1 chemistry 1 histology	1 bacteriology (crutches) --
Osteomyelitis	--	1 bacteriology	--
Paraplegic	--	--	1 bacteriology (wheelchair)
Spina Bifida	--	--	1 cytology (crutches)
Cardio-Pulmonary	2 general 1 blood bank	-- --	1 chemistry --
Dwarfs	1 chemistry 1 histology	1 general	--
TOTALS	11	10	7

(Employees who had the most difficulty moving around tended to be limited to bacteriology, histology and cytology - i.e., to sitting down jobs.)

PART THREE: PUBLISHED MATERIALS

List of Articles in Professional Journals and Newspapers

"Careers for the Disabled," Howard Rusk, M.D., New York Times, April 2, 1967

"Wanted: Handicapped Workers for Medical Laboratory Work," Thomas M. Peery, M.D. and Catherine Milos, Journal of Rehabilitation, May-June 1967

"Wanted: Deaf and Hard of Hearing Staff for Medical Labs," Thomas M. Peery, M.D., Hearing & Speech News, September 1967

"Employment of Physically Handicapped," Rosser L. Mainwaring, M.D., The Bulletin of Pathology, Vol. 9, No. 8, August 1968

"Disabled Workers Can Come to the Aid of the Laboratory," Dallas Johnson, ASMT News, September 1968

"Laboratory Careers for the Disabled," Catherine Milos, Rehabilitation Record, November-December 1968

"Handicapped Workers Rate High as Lab Employees," Martin S. Ulan, Hospitals, Journal of the American Hospital Association, February 16, 1969

"Hospital Administrators and VR Officers Can Work Together to Staff Medical Laboratories," Thomas M. Peery, M.D., Hospital Progress, May 1969

(Copies are available for a limited time from the National Committee for Careers in Medical Technology, 9650 Rockville Pike, Bethesda, Maryland 20014)

Brochure, "Breaking Down the Barriers: Careers for the Disabled in the Medical Laboratory"

The brochure, which is attached, was developed to help rehabilitation counselors evaluate the medical laboratory field for their disabled clients. It was mailed to all state and district DVR offices for counselors and was also sent to all AMA-Approved Schools of Medical Technology, Cytotechnology and Certified Laboratory Assistants during the final year of the project.